JVC

SERVICE MANUAL

TV/VCR COMBO

TV-20F242

VHS SQPB 4 HEAD

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No. 51768
Nov. 2000

SPECIFICATIONS

TELEVISION

Picture Tube:	20" (measured diagonally)
Tuner Type:	Quartz PLL Frequency Synthesized
Receiving Channels:	VHF 2-13
	UHF 14-69
	CATV 14-36 (A)-(W)
	37-59 (AA)-(WW)
	60-85 (AAA)-(ZZZ)
	86-94 (86)-(94)
	95-99 (A-5)-(A-1)
	100-125 (100)-(125)
	01 (5A)
Antenna Input:	VHF/UHF In 75 ohms coaxial
Speaker:	3", 8 ohms x 2
Audio Output Power:	1.5 + 1.5 W

VCR

Video System:	VHS ,4 Rotary Heads Helical scanning System
Video Signal:	NTSC Color
Cassette Tape:	VHS
Video Head:	4 Head
Audio Track:	Hi-Fi Sound - 2 Tracks
	MONO Sound - 1 Tracks
Tape Speed:	SP:33.35mm/sec
	EP:11.12mm/sec
F.FWD/REW Time:	Approx. 1 minutes and 48 seconds (T-120 Cassette)
Speed Search:	SP 3&5 X Normal Speed
	EP 9&15 X Normal Speed

GENERAL

Power Source:	AC 120V 60Hz
Power Consumption:	115 Watts
Dimensions:	W 19-3/4" x D 19" x H 20-1/4"
Weight:	55.2 Ibs
Inputs/Outputs:	Video: In (RCA) 1Vp-p 75 ohm
	Out (RCA) 1Vp-p 75 ohm
	Audio: In (RCA) 300 mV/50K ohm
	Out (RCA) 300 mV/1K ohm
Headphone Jack:	3.5mm Stereo mini-jack
Storage Temperature	-20 ∫C ~ 60 ∫C
Operating Temperature	5 ∫C ~ 40 ∫C

Accessories:

Remote Control X 1

Batteries (AA) X 2

Design & specification are subject to change without notice.

SAFETY PRECAUTIONS

Operating the receiver outside of its cabinet or with its back removed involves a shock hazard. Work on these models should only be performed by those who are thoroughly familiar with precautions necessary when working on high voltage equipment.

Exercise care when servicing this chassis with power applied. Many B plus and high voltage RF terminals are exposed which, if carelessly contacted, can cause serious shock or result in damage to the chassis. Maintain interconnecting ground lead connections between chassis, escutcheon, picture tube dag and tuner cluster when operating the chassis.

These receivers have a "polarized" AC line cord. The AC plug is designed to fit into standard AC outlets in one direction only. The wide blade connects to the "ground side" and the narrow blade connects to the "hot side" of the AC line. This assures that the TV receiver is properly grounded to the house wiring. If an extension cord must be used, make sure it is of the "polarized" type.

Since the chassis of this receiver is connected to one side of the AC supply during operation, service should not be attempted by anyone not familiar with the precautions necessary when working on these types of equipment.

When it is necessary to make measurements or tests with AC power applied to the receiver chassis, an Isolation Transformer must be used as a safety precaution and to prevent possible damage to transistors. The Isolation Transformer should be connected between the TV line cord plug and the AC power outlet.

Certain HV failures can increase X-ray radiation. Receivers should not be operated with HV levels exceeding the specified rating for their chassis type. The maximum operating HV specified for the chassis used in these receivers is 32kV 1.0kV at zero beam current with a line voltage of 120V AC. Higher voltage may also increase the possibility of failure in the HV supply.

It is important to maintain specified values of all components in the horizontal and high voltage circuits and anywhere else in the receiver that could cause a rise in high voltage, or operating supply voltages. No changes should be made to the original design of the receiver.

Components shown in the shaded areas on the schematic diagram and/or identified by ⚠ in the replacement parts list should be replaced only with exact factory recommended replacement parts. The use of unauthorized substitute parts may create shock, fire, X-ray radiation, or other hazards.

To determine the presence of high voltage, use an accurate high impedance HV meter connected between the second anode lead and the CRT dag grounding device. When servicing the High Voltage System, remove static charges from it by connecting a 10k ohm resistor in series with an insulated wire (such as a test probe) between the picture tube dag and 2nd anode lead (have AC line cord disconnected from AC supply).

The picture tube used in this receiver employs integral implosion protection. Replace with a tube of the same type number for continued safety. Do not lift picture tube by the neck. Handle the picture tube only when wearing shatterproof goggles and after discharging the high voltage completely. Keep others without shatterproof goggles away.

When removing springs or spring mounted parts from the tuner, tuner cluster or chassis, shatterproof goggles must be worn. Keep others without shatterproof goggles away.

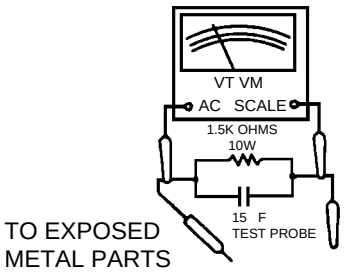
Before returning the receiver to the user, perform the following safety checks:

1. Inspect all lead dress to make certain that leads are not pinched or that hardware is not lodged between the chassis and other metal parts in the receiver.
2. Replace all protective devices such as nonmetallic control knobs, insulating fishpapers, cabinet backs, adjustment and compartment covers or shields, isolation resistor-capacitor networks, mechanical insulators, etc.
3. To be sure that no shock hazard exists, a check for the presence of leakage current should be made at each exposed metal part having a return path to the chassis (antenna, cabinet metal, screw heads, knobs and/or shafts, escutcheon, etc.) in the following manner.

Plug the AC line cord directly into a 120V AC receptacle. (Do not use an Isolation Transformer during these checks.) All checks must be repeated with the AC line cord plug connection reversed. (If necessary, a nonpolarized adapter plug must be used only for the purpose of completing these checks.)

If available, measure current using an accurate leakage current tester. Any reading of 0.35mA or more is excessive and indicates a potential shock hazard which must be corrected before returning the receiver to the owner.

If a reliable leakage current tester is not available, this alternate method of measurement should be used. Using two clip leads, connect a 1500 ohm, 10 watt resistor paralleled by a 0.15 F capacitor in series with a known earth ground, such as a water pipe or conduit and the metal part to be checked. Use a VTVM or VOM with 1000 ohms per volt, or higher, sensitivity to measure this AC voltage drop across the resistor. Any reading of 0.35 volt RMS or more is excessive and indicates a potential shock hazard which must be corrected before returning the receiver to the owner.



SPECIFIC SERVICE INSTRUCTIONS

DISASSEMBLY INSTRUCTIONS

1. REMOVAL OF MECHANICAL PARTS AND P.C. BOARDS

1-1: BACK CABINET (Refer to Fig. 1-1)

1. Remove the 6 screws ①.
2. Remove the 2 screws ② which are used for holding the Back Cabinet.
3. Remove the AC cord from the AC cord hook ③.
4. Remove the Back Cabinet in the direction of arrow.

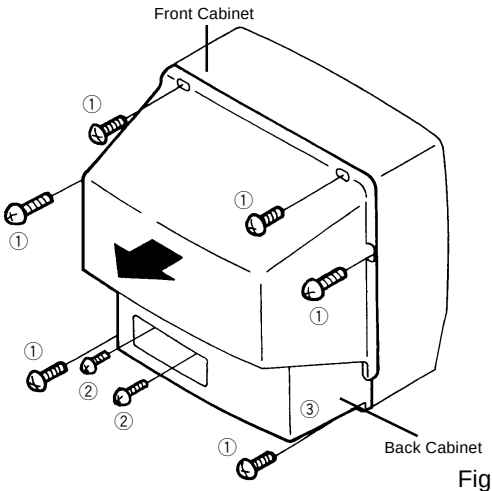


Fig. 1-1

1-2: CRT PCB (Refer to Fig. 1-2)

CAUTION: BEFORE REMOVING THE ANODE CAP, DISCHARGE ELECTRICITY BECAUSE IT CONTAINS HIGH VOLTAGE. BEFORE ATTEMPTING TO REMOVE OR REPAIR ANY PCB, UNPLUG THE POWER CORD FROM THE AC SOURCE.

1. Remove the Anode Cap. (Refer to REMOVAL OF ANODE CAP)
2. Disconnect the following connectors: (CP802 and CP805).
3. Remove the CRT PCB in the direction of arrow.

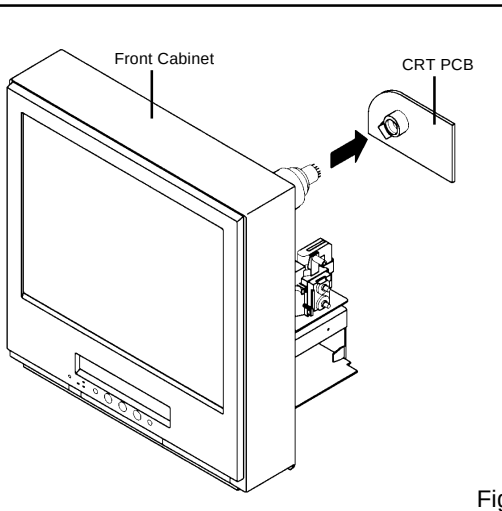


Fig. 1-2

1-3: TV/VCR BLOCK (Refer to Fig. 1-3)

1. Remove the 2 screws ①.
2. Disconnect the following connectors: (CP401, CP502, CP4201 and CP4202).
3. Unlock the support ②.
4. Remove the TV/VCR Block in the direction of arrow.

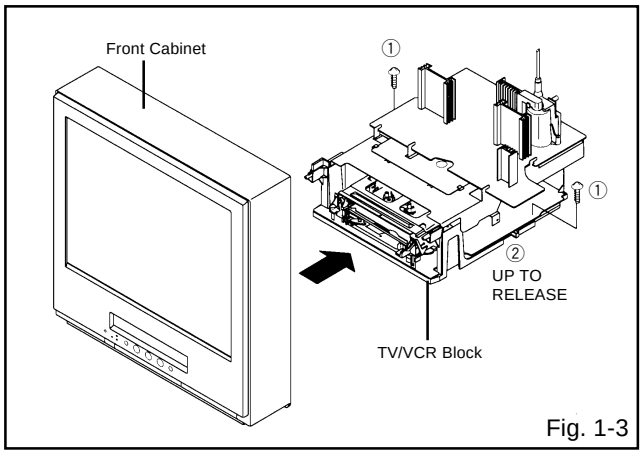


Fig. 1-3

1-4: MAIN PCB (Refer to Fig. 1-4)

1. Remove the screw ①.
2. Remove the Main PCB Holder.
3. Remove the 2 screws ②.
4. Remove the 3 screws ③.
5. Disconnect the following connectors: (CP810 and CP820).
6. Remove the Main PCB in the direction of arrow.

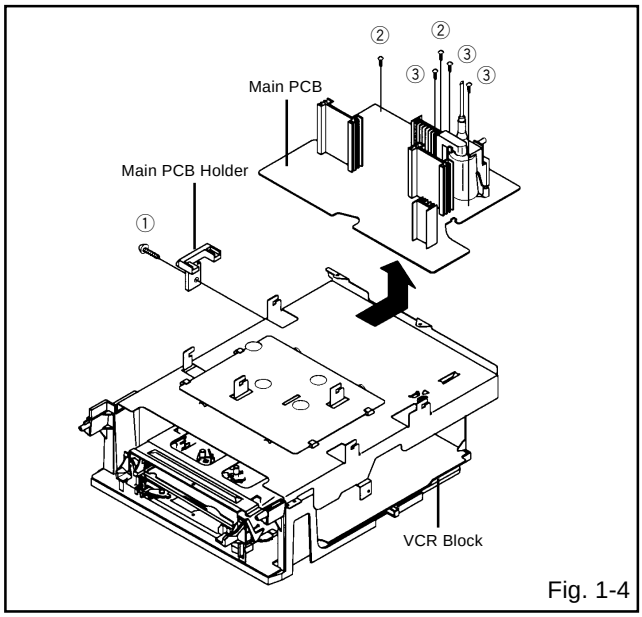


Fig. 1-4

1-5: DECK SHIELD PLATE (Refer to Fig. 1-5)

1. Remove the 2 screws ①.
2. Remove the screw ②.
3. Remove the Deck Shield Plate in the direction of arrow.

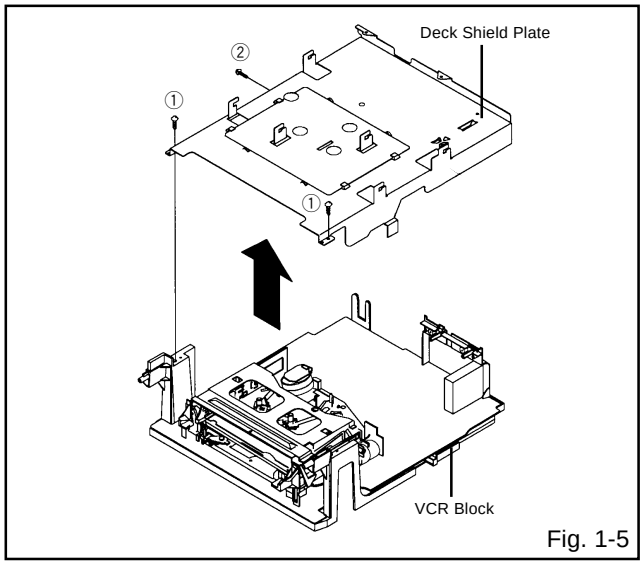


Fig. 1-5

1-6: DECK CHASSIS (Refer to Fig. 1-6)

1. Remove the 3 screws ①.
2. Disconnect the following connectors:
   (CP1004, CP1005, CP1006, CP4001, CP4002 and CP4003).
3. Remove the Deck Chassis in the direction of arrow.

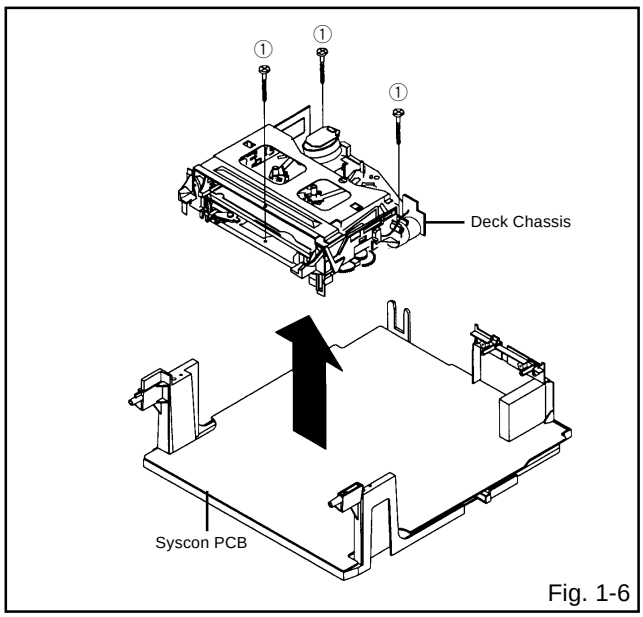


Fig. 1-6

1-7: JACK PLATE AND SYSCON PCB (Refer to Fig. 1-7)

1. Remove the screw ①.
2. Remove the Syscon PCB in the direction of arrow (A).
3. Remove the 2 screws ②.
4. Remove the nut ③.
5. Remove the washer ④.
6. Unlock the 2 supports ⑤.
7. Remove the Jack Plate in the direction of arrow (B).

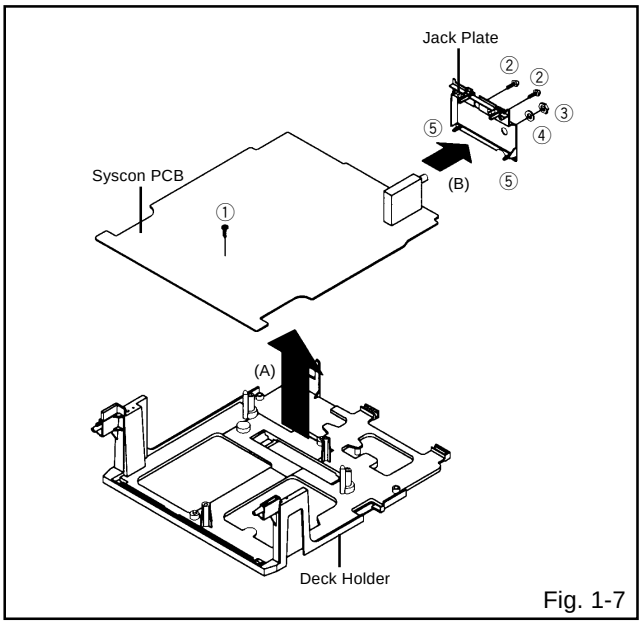


Fig. 1-7

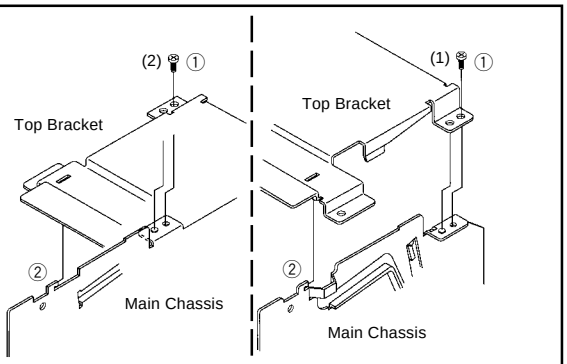
2. REMOVAL OF DECK PARTS

2-1: TOP BRACKET (Refer to Fig. 2-1)

1. Remove the 2 screws ①.
2. Slide the 2 supports ② and remove the Top Bracket.

NOTE

When you install the Top Bracket, install the screw (1) first, then install the screw (2).



• Screw Torque: 5 ± 0.5kgf•cm

Fig. 2-1

2-2: FLAP LEVER/TAPE GUIDE R (Refer to Fig. 2-2)

1. Move the Cassette Holder Ass'y to the back side.
2. Remove the Polyslider Washer ①.
3. Remove the Flap Lever.
4. Unlock the 3 supports ② and remove the Tape Guide R.

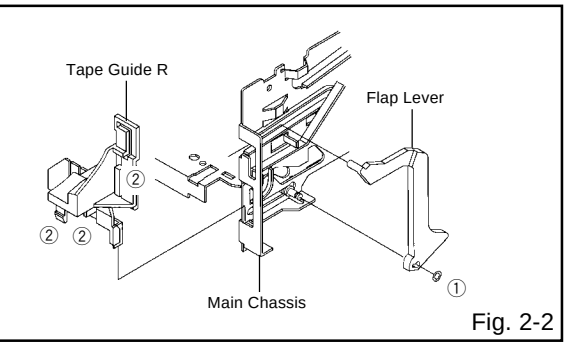


Fig. 2-2

2-3: TAPE GUIDE L (Refer to Fig. 2-3-A)

1. Move the Cassette Holder Ass'y to the back side.
2. Unlock the 2 supports ① and remove the Tape Guide L.
3. Remove the REC Lever.

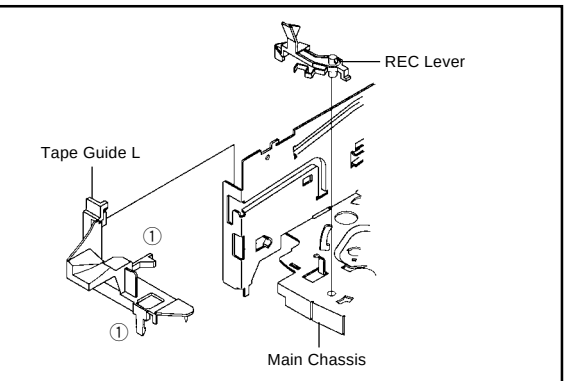


Fig. 2-3-A

NOTE

When you install the Tape Guide L, install as shown in the circle of Fig. 2-3-B. **(Refer to Fig. 2-3-B)**

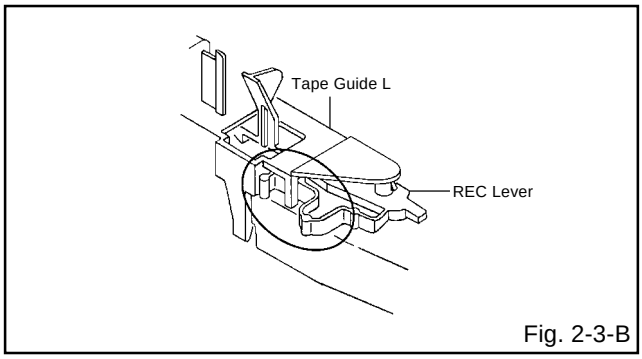


Fig. 2-3-B

2-4: CASSETTE HOLDER ASS'Y (Refer to Fig. 2-4)

1. Move the Cassette Holder Ass'y to the front side.
2. Push the Locker R to remove the Cassette Side R.
3. Remove the Cassette Side L.

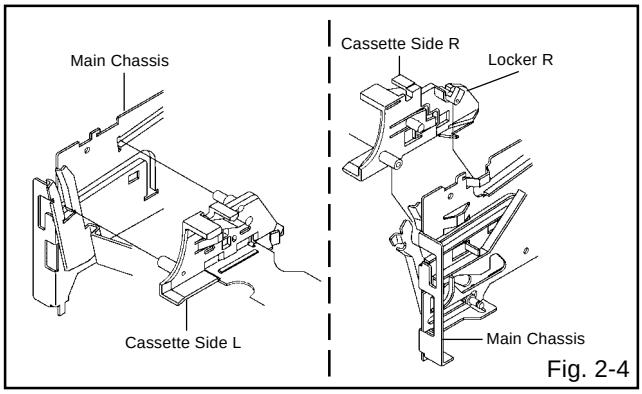


Fig. 2-4

2-5: CASSETTE SIDE L/R (Refer to Fig. 2-5)

1. Unlock the 4 supports ① and then remove the Cassette Side L/R.

NOTE

When you install the Cassette Side R, be sure to move the Locker R after installing.

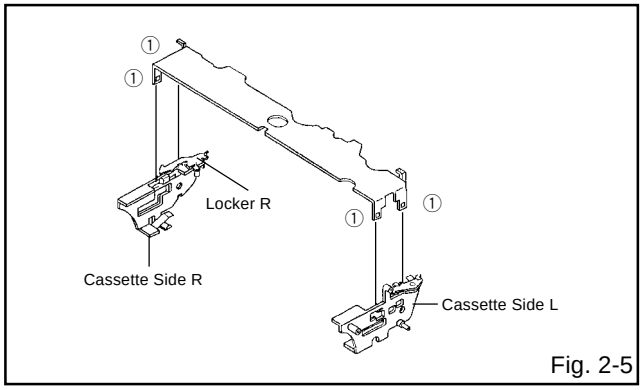


Fig. 2-5

2-6: LINK ASS'Y (Refer to Fig. 2-6)

1. Set the Link Ass'y to the Eject position.
2. Remove the (A) side of the Link Ass'y first, then remove the (B) side.

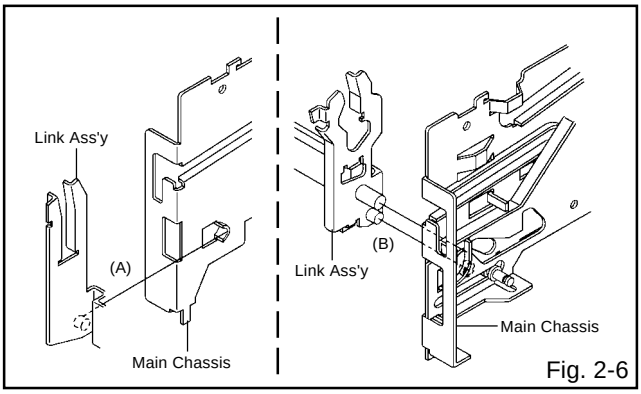
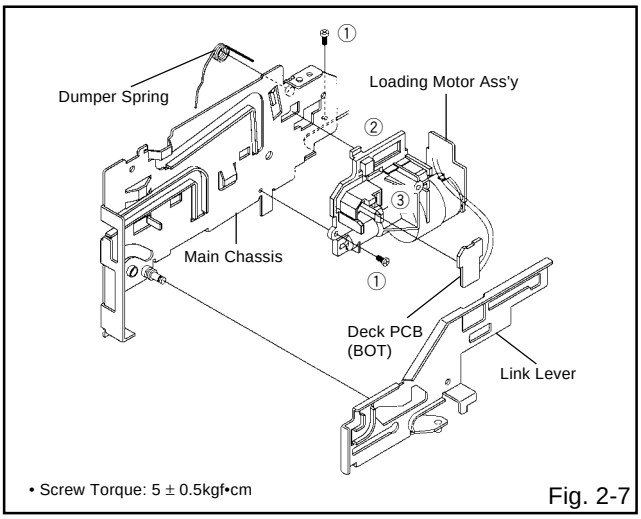


Fig. 2-6

2-7: LOADING MOTOR ASS'Y (Refer to Fig. 2-7)

1. Remove the Link Lever.
2. Remove the Dumper Spring.
3. Remove the 2 screws ①.
4. Unlock the support ② and remove the Loading Motor Ass'y.
5. Unlock the 2 supports ③ and remove the Deck PCB (BOT).



• Screw Torque: 5 ± 0.5kgf•cm

Fig. 2-7

2-8: SENSOR COVER L3 (Refer to Fig. 2-8)

1. Unlock the support ① and remove the Sensor Cover L3.

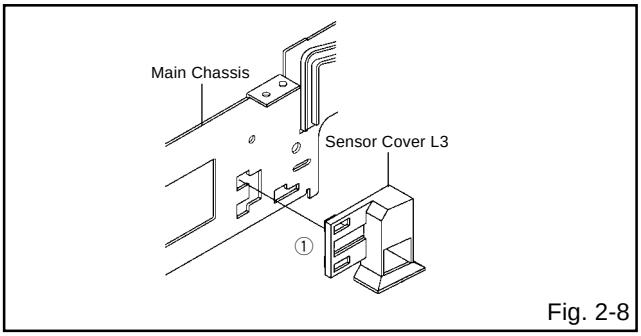


Fig. 2-8

2-9: TENSION ASS'Y (Refer to Fig. 2-9-A)

1. Move the Inclined S Ass'y to the back side.
2. Remove the Tension Spring.
3. Unlock the support ① and remove the Tension Arm Ass'y.
4. Remove the Tension Adjust.
5. Unlock the 2 supports ② and remove the Tension Band Ass'y.
6. Unlock the support ③ and remove the Tension Holder.
7. Remove the SS Brake Spring.
8. Remove the SS Arm Brake.

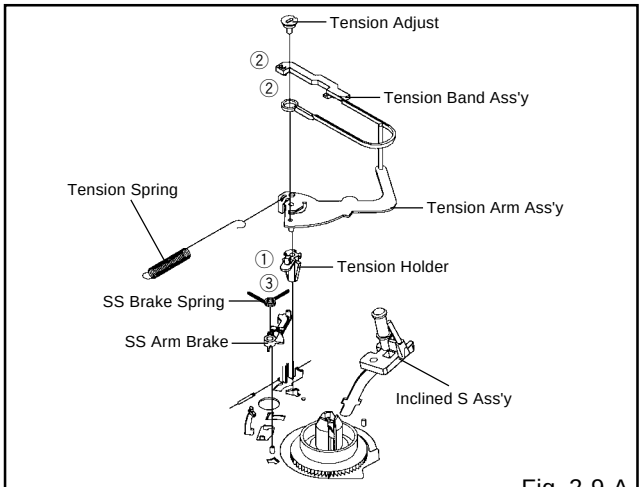


Fig. 2-9-A

NOTE

When you install the Tension Adjust, install as shown in Fig. 2-9-B. **(Refer to Fig. 2-9-B)**

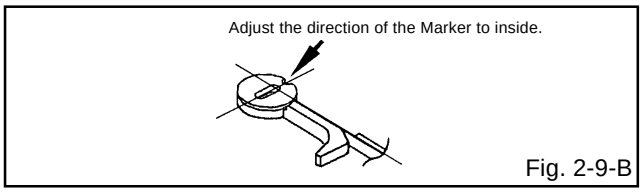


Fig. 2-9-B

2-10: T BRAKE ASS'Y (Refer to Fig. 2-10)

1. Remove the T Brake Spring.
2. Remove the T Brake Ass'y.

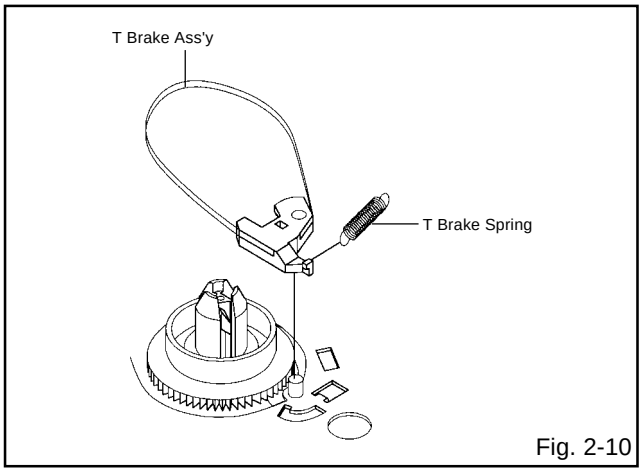


Fig. 2-10

2-11: S REEL/T REEL (Refer to Fig. 2-11)

1. Remove the S Reel and T Reel.
2. Remove the 2 Polyslider Washers ①.

NOTE

1. Take care not to damage the gears of the S Reel and T Reel.
2. The Polyslider Washer may be remained on the back of the reel.
3. Take care not to damage the shaft.
4. Do not touch the section "A" of S Reel and T Reel. (Use gloves.) **(Refer to Fig. 2-11)** Do not adhere the stains on it.
5. When you install the reel, clean the shaft and oil it (FL OIL #6115). (If you do not oil, noise may be heard in FF/REW mode.)
6. After installing the reel, adjust the height of the reel. **(Refer to MECHANICAL ADJUSTMENT)**

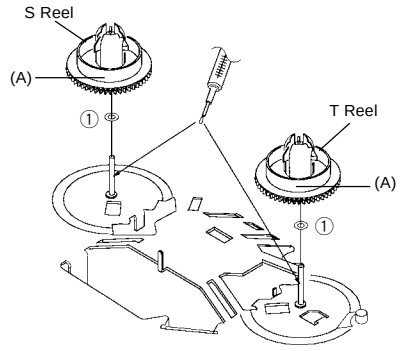
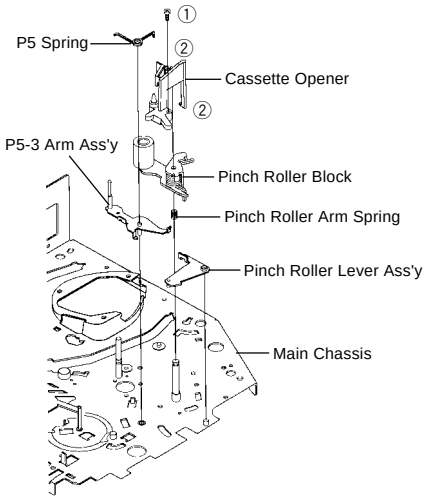


Fig. 2-11

2-12: PINCH ROLLER BLOCK/P5-3 ARM ASS'Y (Refer to Fig. 2-12-A)

1. Remove the P5 Spring.
2. Remove the screw ①.
3. Unlock the 2 supports ② and remove the Cassette Opener.
4. Remove the Pinch Roller Block, Pinch Roller Arm Spring, Pinch Roller Lever Ass'y and P5-3 Arm Ass'y.



• Screw Torque: 5 ± 0.5kgf•cm

Fig. 2-12-A

NOTE

1. Do not touch the Pinch Roller. (Use gloves.)
2. When you install the Pinch Roller Block, install as shown in the circle of Fig. 2-12-B. **(Refer to Fig. 2-12-B)**

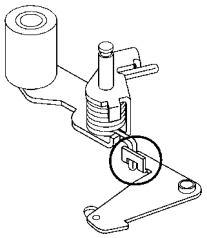


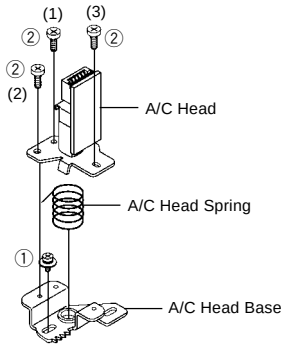
Fig. 2-12-B

2-13: A/C HEAD (Refer to Fig. 2-13-A)

1. Remove the screw ①.
2. Remove the A/C Head Base.
3. Remove the 3 screws ②.
4. Remove the A/C Head and A/C Head Spring.

NOTE

1. Do not touch the A/C Head. (Use gloves.)
2. When you install the A/C Head Spring, install as shown in Fig. 2-13-B. **(Refer to Fig. 2-13-B)**
3. When you install the A/C Head, tighten the screw (1) first, then tighten the screw (2), finally tighten the screw (3).



• Screw Torque: 4 ± 0.5kgf•cm (Screw ①)

Fig. 2-13-A

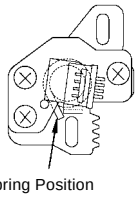
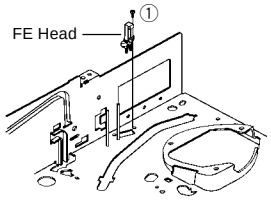


Fig. 2-13-B

2-14: FE HEAD (Refer to Fig. 2-14)

1. Remove the screw ①.
2. Remove the FE Head.



• Screw Torque: 4 ± 0.5kgf•cm

Fig. 2-14

2-15: AHC ASS'Y/CYLINDER UNIT ASS'Y (Refer to Fig. 2-15)

1. Unlock the support ① and remove the AHC Ass'y.
2. Remove the 3 screws ②.
3. Remove the Cylinder Unit Ass'y.

NOTE

When you install the Cylinder Unit Ass'y, tighten the screws from (1) to (3) in order while pulling the Ass'y toward the left front direction.

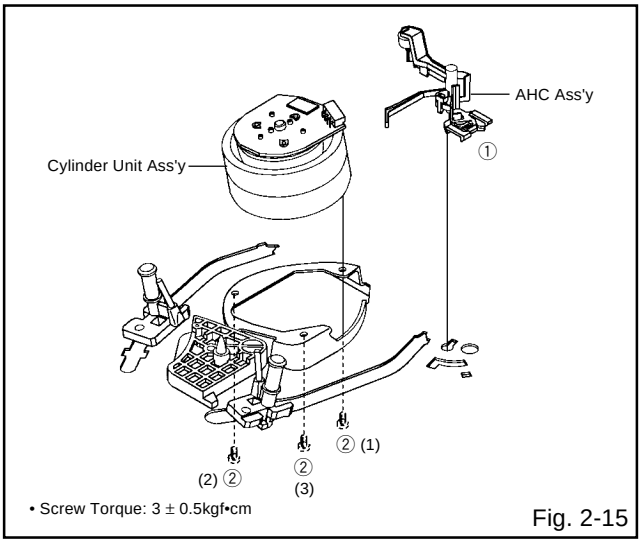


Fig. 2-15

2-16: CAPSTAN DD UNIT (Refer to Fig. 2-16)

1. Remove the Capstan Belt.
2. Remove the 3 screws ①.
3. Remove the Capstan DD Unit.

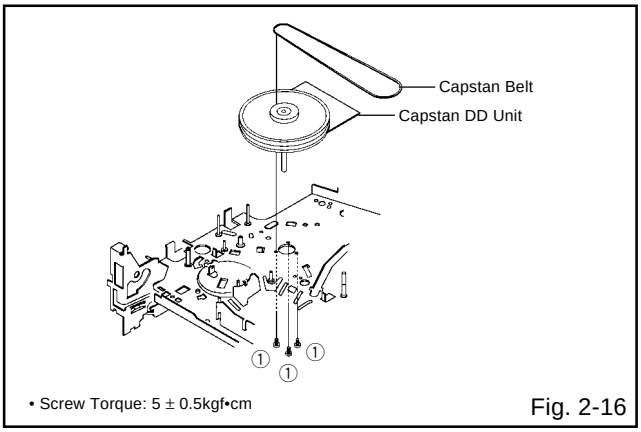


Fig. 2-16

2-17: MIDDLE GEAR/MAIN CAM (Refer to Fig. 2-17-A)

1. Remove the Polyslider Washer ①, then remove the Middle Gear.
2. Remove the E-Ring, then remove the Main Cam, P5 Cam and Pinch Roller Cam.
3. Remove the Polyslider Washer ②, then remove the Joint Gear.

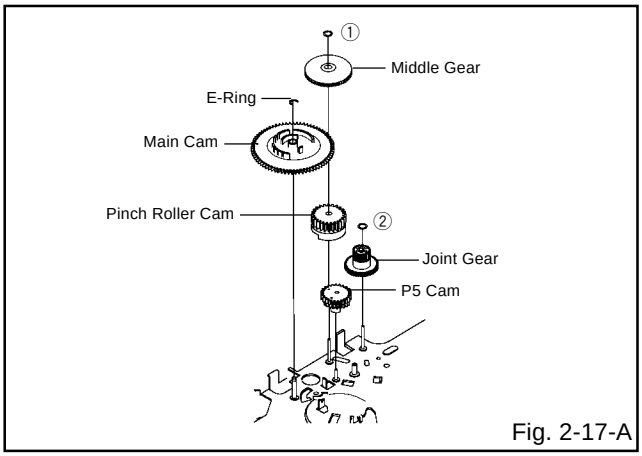


Fig. 2-17-A

NOTE

When you install the Pinch Roller Cam, P5 Cam and Main Cam, align each marker. **(Refer to Fig. 2-17-B)**

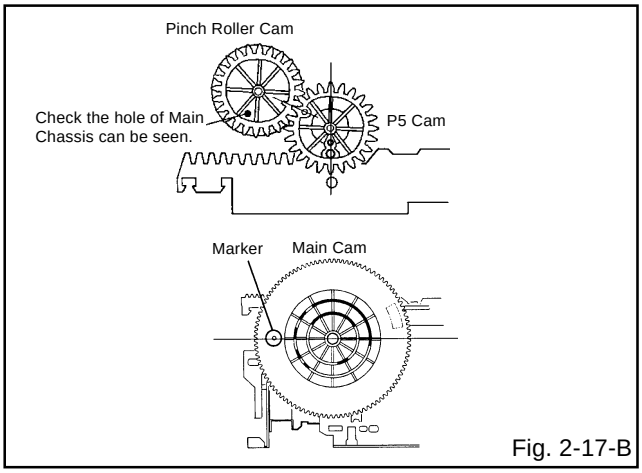


Fig. 2-17-B

2-18: CLUTCH ASS'Y (Refer to Fig. 2-18)

1. Remove the Polyslider Washer ①.
2. Remove the Clutch Ass'y, Ring Spring and Coupling Gear.
3. Unlock the 2 supports ② and remove the Clutch Lever.

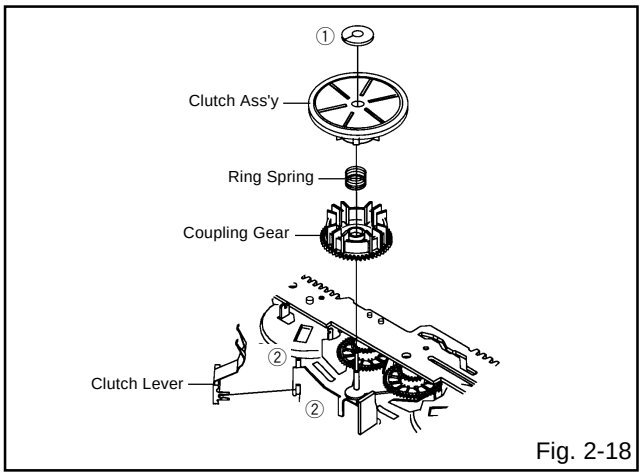
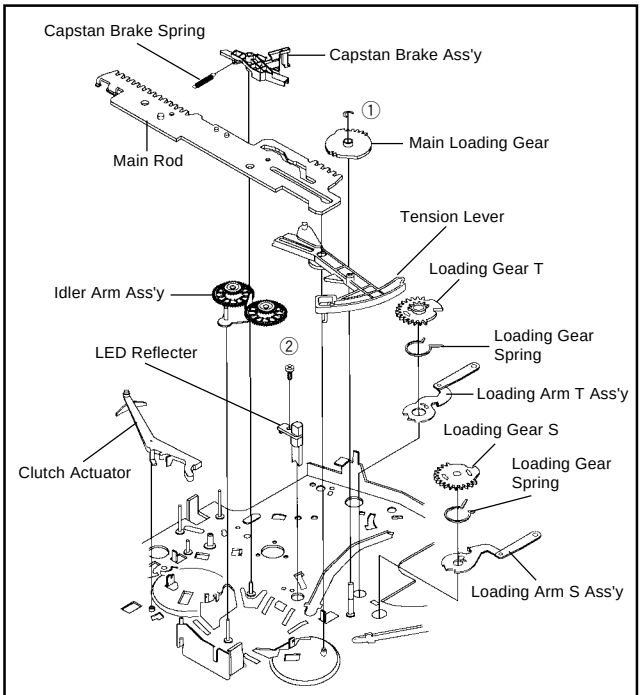


Fig. 2-18

2-19: LOADING GEAR S/T ASS'Y (Refer to Fig. 2-19-A)

1. Remove the E-Ring ① and remove the Main Loading Gear.
2. Remove the Capstan Brake Spring.
3. Slide the Main Rod and remove the Capstan Brake Ass'y.
4. Remove the Main Rod, Tension Lever, Clutch Actuator, Idler Arm Ass'y.
5. Remove the screw ②.
6. Remove the LED Reflecter.
7. Remove the Loading Arm S Ass'y and Loading Arm T Ass'y.
8. Remove the Loading Gear S and Loading Gear T.
9. Remove the Loading Gear Spring.



• Screw Torque: 5 ± 0.5kgf•cm

Fig. 2-19-A

NOTES

1. When you install the Loading Arm S Ass'y, Loading Arm T Ass'y and Main Loading Gear, align each marker. **(Refer to Fig. 2-19-B)**

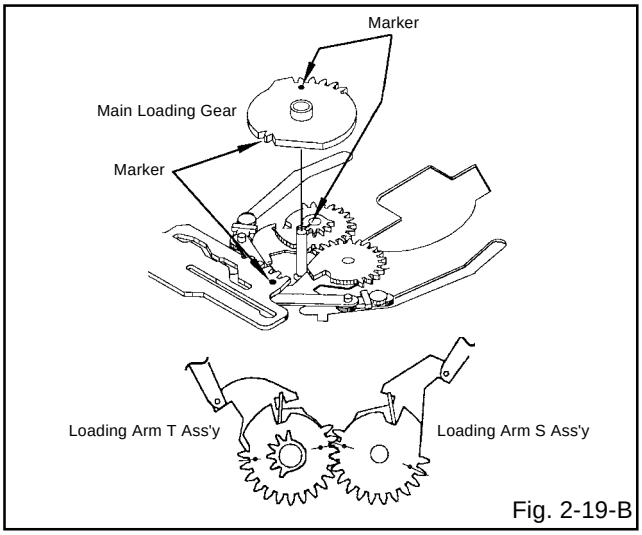


Fig. 2-19-B

2. When you install the Clutch Actuator, install as shown in the circle of Fig. 2-19-C. **(Refer to Fig. 2-19-C)**

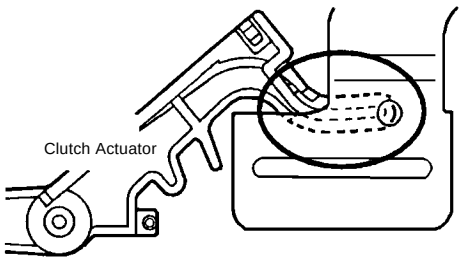


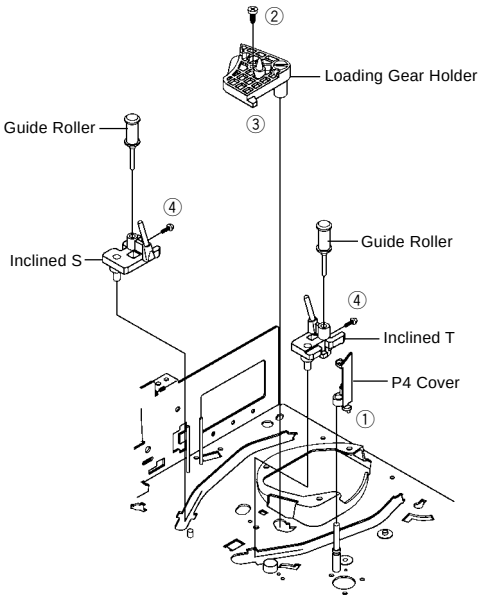
Fig. 2-19-C

2-20: INCLINED S/T ASS'Y (Refer to Fig. 2-20)

1. Unlock the support ① and remove the P4 Cover.
2. Remove the screw ②.
3. Unlock the support ③ and remove the Loading Gear Holder.
4. Remove the Inclined S.
5. Remove the Inclined T.
6. Remove the 2 screws ④, then remove the Guide Roller.

NOTE

Do not touch the roller of Guide Roller.



• Screw Torque: 5 ± 0.2kgf•cm (Screw ②)
• Screw Torque: 0.7 ± 0.2kgf•cm (Screw ④)

Fig. 2-20

3. REMOVAL OF ANODE CAP

Read the following **NOTED** items before starting work.

* After turning the power off there might still be a potential voltage that is very dangerous. When removing the Anode Cap, make sure to discharge the Anode Cap's potential voltage.
* Do not use pliers to loosen or tighten the Anode Cap terminal, this may cause the spring to be damaged.

REMOVAL

1. Follow the steps as follows to discharge the Anode Cap. **(Refer to Fig. 3-1.)**
   Connect one end of an Alligator Clip to the metal part of a flat-blade screwdriver and the other end to ground.
   While holding the plastic part of the insulated Screwdriver, touch the support of the Anode with the tip of the Screwdriver.
   A cracking noise will be heard as the voltage is discharged.

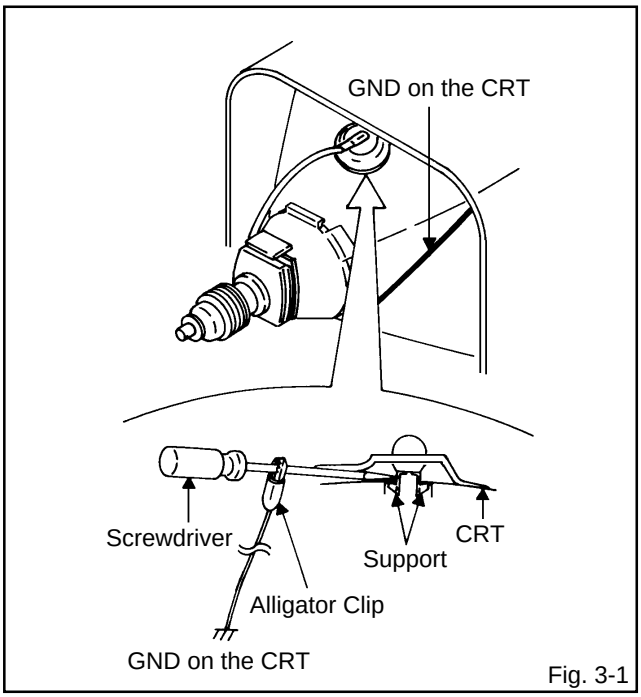


Fig. 3-1

2. Flip up the sides of the Rubber Cap in the direction of the arrow and remove one side of the support. **(Refer to Fig. 3-2.)**

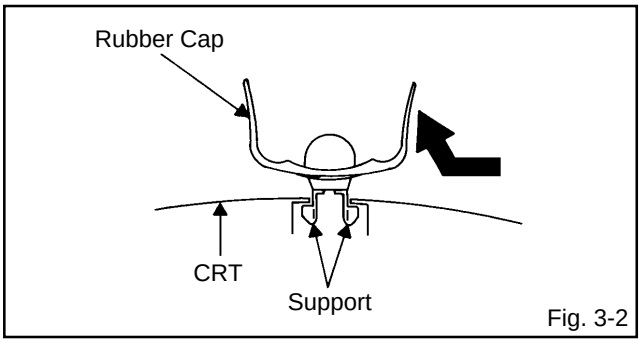


Fig. 3-2

3. After one side is removed, pull in the opposite direction to remove the other.

NOTE

Take care not to damage the Rubber Cap.

INSTALLATION

1. Clean the spot where the cap was located with a small amount of alcohol. **(Refer to Fig. 3-3.)**

NOTE

Confirm that there is no dirt, dust, etc. at the spot where the cap was located.

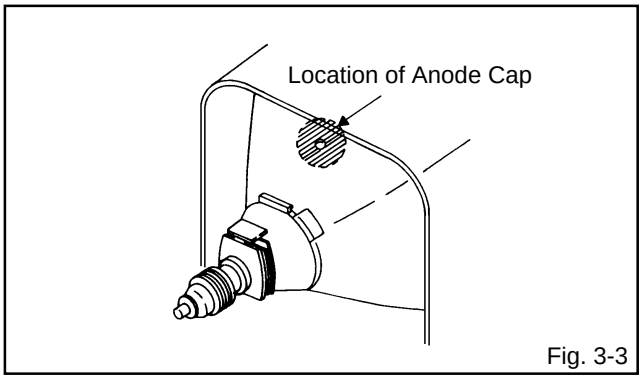


Fig. 3-3

2. Arrange the wire of the Anode Cap and make sure the wire is not twisted.
3. Turn over the Rubber Cap. **(Refer to Fig. 3-4.)**

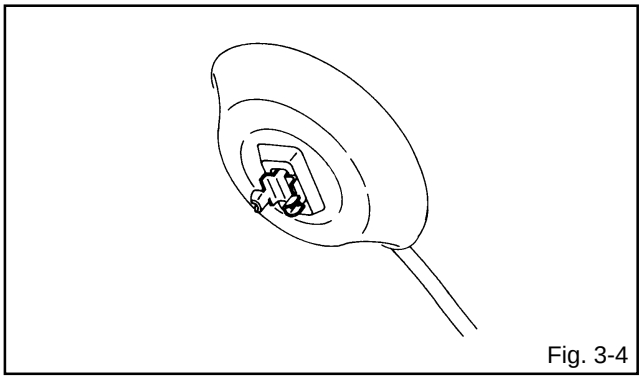


Fig. 3-4

4. Insert one end of the Anode Support into the anode button, then the other as shown in **Fig. 3-5**.

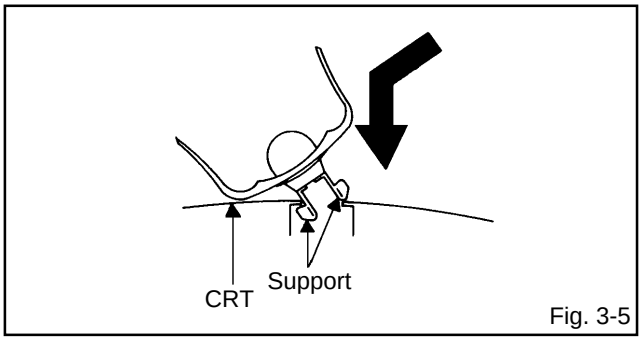


Fig. 3-5

5. Confirm that the Support is securely connected.
6. Put on the Rubber Cap without moving any parts.

KEY TO ABBREVIATIONS

A	**A/C**	:	Audio/Control
	ACC	:	Automatic Color Control
	AE	:	Audio Erase
	AFC	:	Automatic Frequency Control
	AFT	:	Automatic Fine Tuning
	AFT DET	:	Automatic Fine Tuning Detect
	AGC	:	Automatic Gain Control
	AMP	:	Amplifier
	ANT	:	Antenna
	A.PB	:	Audio Playback
	APC	:	Automatic Phase Control
	ASS'Y	:	Assembly
	AT	:	All Time
	AUTO	:	Automatic
	A/V	:	Audio/Video
B	**BGP**	:	Burst Gate Pulse
	BOT	:	Beginning of Tape
	BPF	:	Bandpass Filter
	BRAKE SOL	:	Brake Solenoid
	BUFF	:	Buffer
	B/W	:	Black and White
C	**C**	:	Capacitance, Collector
	CASE	:	Cassette
	CAP	:	Capstan
	CARR	:	Carrier
	CH	:	Channel
	CLK	:	Clock
	CLOCK (SY-SE)	:	Clock (Syscon to Servo)
	COMB	:	Combination, Comb Filter
	CONV	:	Converter
	CPM	:	Capstan Motor
	CTL	:	Control
	CYL	:	Cylinder
	CYL-M	:	Cylinder-Motor
	CYL SENS	:	Cylinder-Sensor
D	**DATA (SY-CE)**	:	Data (Syscon to Servo)
	dB	:	Decibel
	DC	:	Direct Current
	DD Unit	:	Direct Drive Motor Unit
	DEMOD	:	Demodulator
	DET	:	Detector
	DEV	:	Deviation
E	**E**	:	Emitter
	EF	:	Emitter Follower
	EMPH	:	Emphasis
	ENC	:	Encoder
	ENV	:	Envelope
	EOT	:	End of Tape
	EQ	:	Equalizer
	EXT	:	External
F	**F**	:	Fuse
	FBC	:	Feed Back Clamp
	FE	:	Full Erase
	FF	:	Fast Forward, Flipflop
	FG	:	Frequency Generator
	FL SW	:	Front Loading Switch
	FM	:	Frequency Modulation
	FSC	:	Frequency Sub Carrier
	FWD	:	Forward
G	**GEN**	:	Generator
	GND	:	Ground
H	**H.P.F**	:	High Pass Filter
	H.SW	:	Head Switch
	Hz	:	Hertz
I	**IC**	:	Integrated Circuit
	IF	:	Intermediate Frequency
	IND	:	Indicator
	INV	:	Inverter
K	**KIL**	:	Killer
L	**L**	:	Left
	LED	:	Light Emitting Diode
	LIMIT AMP	:	Limiter Amplifier
	LM, LDM	:	Loading Motor
	LP	:	Long Play
	L.P.F	:	Low Pass Filter
	LUMI.	:	Luminance
M	**M**	:	Motor
	MAX	:	Maximum
	MINI	:	Minimum
	MIX	:	Mixer, mixing
	MM	:	Monostable Multivibrator
	MOD	:	Modulator, Modulation
	MPX	:	Multiplexer, Multiplex
	MS SW	:	Mecha State Switch
N	**NC**	:	Non Connection
	NR	:	Noise Reduction
O	**OSC**	:	Oscillator
	OPE	:	Operation
P	**PB**	:	Playback
	PB CTL	:	Playback Control
	PB-C	:	Playback-Chrominance
	PB-Y	:	Playback-Luminance
	PCB	:	Printed Circuit Board
	P. CON	:	Power Control
	PD	:	Phase Detector
	PG	:	Pulse Generator
	P-P	:	Peak-to Peak
R	**R**	:	Right
	REC	:	Recording
	REC-C	:	Recording-Chrominance
	REC-Y	:	Recording-Luminance
	REEL BRK	:	Reel Brake
	REEL S	:	Reel Sensor
	REF	:	Reference
	REG	:	Regulated, Regulator
	REW	:	Rewind
	REV, RVS	:	Reverse
	RF	:	Radio Frequency
	RMC	:	Remote Control
	RY	:	Relay
S	**S. CLK**	:	Serial Clock
	S. COM	:	Sensor Common
	S. DATA	:	Serial Data
	SEG	:	Segment
	SEL	:	Select, Selector
	SENS	:	Sensor
	SER	:	Search Mode
	SI	:	Serial Input
	SIF	:	Sound Intermediate Frequency
	SO	:	Serial Output
	SOL	:	Solenoid
	SP	:	Standard Play
	STB	:	Serial Strobe
	SW	:	Switch

S	**SYNC**	:	Synchronization
	SYNC SEP	:	Sync Separator, Separation
T	**TR**	:	Transistor
	TRAC	:	Tracking
	TRICK PB	:	Trick Playback
	TP	:	Test Point
U	**UNREG**	:	Unregulated
V	**V**	:	Volt
	VCO	:	Voltage Controlled Oscillator
	VIF	:	Video Intermediate Frequency
	VP	:	Vertical Pulse, Voltage Display
	V.PB	:	Video Playback
	VR	:	Variable Resistor
	V.REC	:	Video Recording
	VSF	:	Visual Search Fast Forward
	VSR	:	Visual Search Rewind
	VSS	:	Voltage Super Source
	V-SYNC	:	Vertical-Synchronization
	VT	:	Voltage Tuning
X	**X'TAL**	:	Crystal
Y	**Y/C**	:	Luminance/Chrominance

SERVICE MODE LIST

This unit provided with the following SERVICE MODES so you can repair, examine and adjust easily.

To enter SERVICE MODE, unplug AC cord till lost actual clock time. Then press and hold Vol (-) button of main unit and remocon key simultaneously.

The both pressing of set key and remote control key will not be possible if clock has been set. To reset clock, either unplug AC cord and allow at least 5 seconds before Power On.

Set Key	Remocon Key	Operations
VOL. (-) MIN	0	Releasing of V-CHIP PASSWORD.
VOL. (-) MIN	1	Initialization of the factory. NOTE: Do not use this for the normal servicing.
VOL. (-) MIN	2	Horizontal position adjustment of OSD. NOTE: Also can be adjusted by using the Adjustment MENU. Refer to the "ELECTRICAL ADJUSTMENT" (OSD HORIZONTAL).
VOL. (-) MIN	3	Adjust the SWITCHING POINT automatically. Refer to the "ELECTRICAL ADJUSTMENT" (PG SHIFTER).
VOL. (-) MIN	4	Adjust the SWITCHING POINT manually. Refer to the "ELECTRICAL ADJUSTMENT" (PG SHIFTER).
VOL. (-) MIN	5	Adjusting of the Tracking to the center position. NOTE: Also can be adjusted by pressing the ATR button for more than 2 seconds during PLAY.
VOL. (-) MIN	6	POWER ON total hours and PLAY/REC total hours are displayed on the screen. Refer to the "PREVENTIVE CHECKS AND SERVICE INTERVALS" (CONFIRMATION OF USING HOURS). Can be checked of the INITIAL DATA of MEMORY IC. Refer to the "NOTE FOR THE REPLACING OF MEMORY IC".
VOL. (-) MIN	8	Writing of EEPROM initial data. NOTE: Do not use this for the normal servicing.
VOL. (-) MIN	9	Display of the Adjustment MENU on the screen. Refer to the "ELECTRICAL ADJUSTMENT" (On-Screen Display Adjustment).

Method	Operations
Press the ATR button on the remote control for more than 2 seconds during PLAY.	Adjusting of the Tracking to the center position. Refer to the "MECHANICAL ADJUSTMENT" (GUIDE ROLLER) and "ELECTRICAL ADJUSTMENT" (SWITCHING POINT).
Make the short circuit between the test point of SERVICE and the GND.	The EOT/BOT/Reel sensor do not work at this moment. Refer to the "PREPARATION FOR SERVICING"

PREVENTIVE CHECKS AND SERVICE INTERVALS

The following standard table depends on environmental conditions and usage. Unless maintenance is properly carried out, the following service intervals may be quite shortened as harmful effects may be had on other parts. Also, long term storage or misuse may cause transformation and aging of rubber parts.

Time / Parts Name	500 hours	1,000 hours	1,500 hours	2,000 hours	3,000 hours	Notes
Audio Control Head	■	■	■	■	■	Clean those parts in contact with the tape.
Full Erase Head (Recorder only)	■	■	■	■	■	
Capstan Belt			■	■	●	Clean the rubber, and parts which the rubber touches.
Pinch Roller	■	■	■	■	■ ●	
Capstan DD Unit					●	
Loading Motor					●	
Tension Band					●	
Capstan Shaft	■	■	■	■	■	
Tape Running Guide Post	■	■	■	■	■	Replace when rolling becomes abnormal.
Cylinder Unit	■	■	■	■	●	Clean the Head

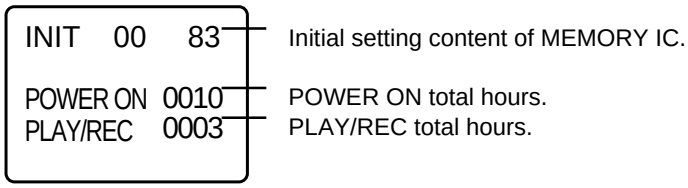
■ : Clean
● : Replace

CONFIRMATION OF USING HOURS

POWER ON total hours and PLAY/REC total hours can be checked on the screen.
Total hours are displayed in 16 system of notation.

NOTE: The confirmation of using hours will not be possible if clock has been set. To reset clock, either unplug AC cord and allow at least 5 seconds before Power On.

1. Set the VOLUME to minimum.
2. While holding down VOLUME button on front cabinet, press key 6 on remote control simultaneously.
3. After the confirmation of using hours, turn off the power.



(16 x 16 x 16 x thousands digit value) + (16 x 16 x hundreds digit value) + (16 x tens digit value) + (ones digit value)

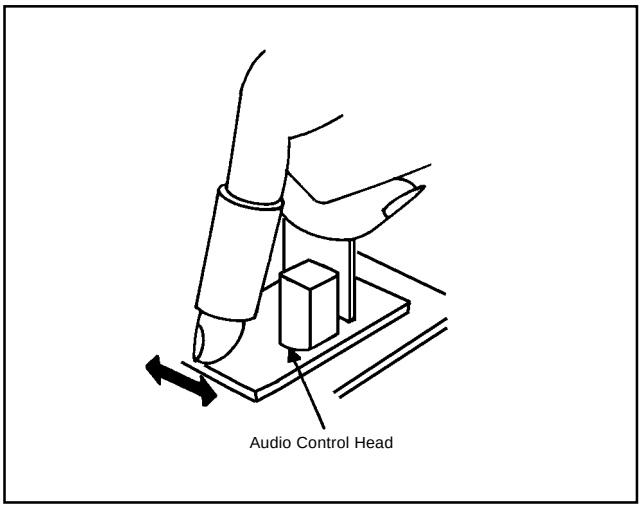
CLEANING

NOTE

After cleaning the heads with isopropyl alcohol, do not run a tape until the heads dry completely. If the heads are not completely dry and alcohol gets on the tape, damage may occur.

1. AUDIO CONTROL HEAD

Wrap a piece of chamois around your finger. Dip it in isopropyl alcohol and clean the audio control head by wiping it horizontally. Clean the full erase head in the same manner. **(Refer to the figure below.)**



2. TAPE RUNNING SYSTEM

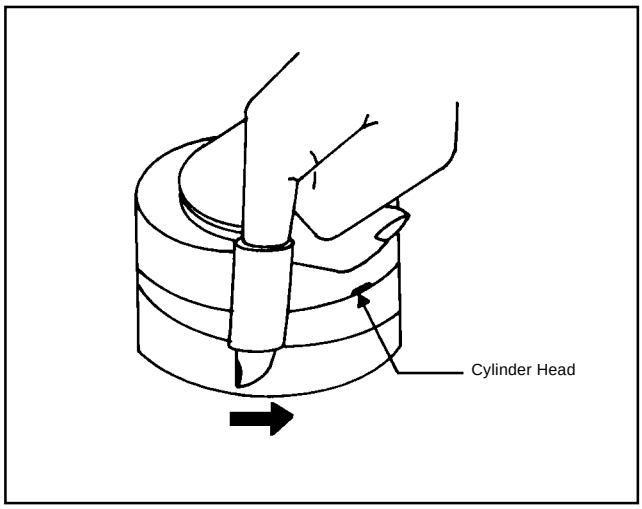
When cleaning the tape transport system, use the gauze moistened with isopropyl alcohol.

3. CYLINDER

Wrap a piece of chamois around your finger. Dip it in isopropyl alcohol. Hold it to the cylinder head softly. Turn the cylinder head counterclockwise to clean it (in the direction of the arrow). **(Refer to the figure below.)**

NOTE

Do not exert force against the cylinder head. Do not move the chamois upward or downward on the head.
Use the chamois one by one.



NOTE FOR THE REPLACING OF MEMORY IC

If a service repair is undertaken where it has been required to change the MEMORY IC, the following steps should be taken to ensure correct data settings while making reference to TABLE 1.

NOTE: Initial Data setting will not be possible if clock has been set. To reset clock, either unplug AC cord and allow at least 5 seconds before Power On.

ADDRESS	DATA	ADDRESS	DATA	ADDRESS	DATA	ADDRESS	DATA	ADDRESS	DATA
00	88	0A	DC	14	27	1E	0E	28	01
01	79	0B	02	15	00	1F	03	29	35
02	A2	0C	63	16	90	20	BA		
03	47	0D	0D	17	05	21	05		
04	C3	0E	17	18	80	22	79		
05	23	0F	0A	19	89	23	05		
06	34	10	8C	1A	A9	24	3E		
07	1B	11	68	1B	22	25	2A		
08	59	12	5C	1C	05	26	39		
09	B2	13	53	1D	39	27	00		

Table 1

1. Enter DATA SET mode by setting VOLUME to minimum.
2. While holding down VOLUME button on front cabinet, press key 6 on remote control simultaneously. ADDRESS and DATA should appear as FIG 1.

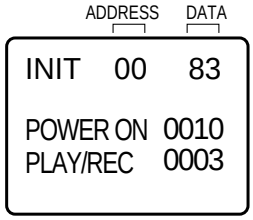


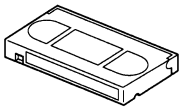
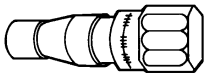
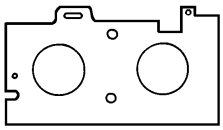
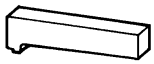
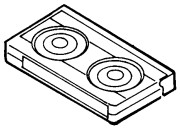
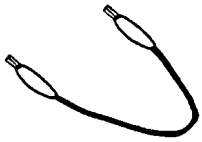
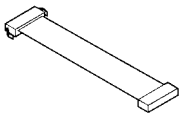
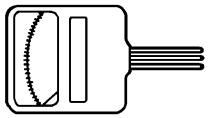
Fig. 1

3. ADDRESS is now selected and should "blink". Using the SET + or - keys on the remote, step through the ADDRESS until required ADDRESS to be changed is reached.
4. Press ENTER to select DATA. When DATA is selected, it will "blink".
5. Again, step through the DATA using SET + or - until required DATA value has been selected.
6. Pressing ENTER will take you back to ADDRESS for further selection if necessary.
7. Repeat steps 3 to 6 until all data has been checked.
8. When satisfied correct DATA has been entered, turn POWER off (return to STANDBY MODE) to finish DATA input.

The unit will now have the correct DATA for the new MEMORY IC.

SERVICE ADJUSTMENT

SERVICING FIXTURES AND TOOLS

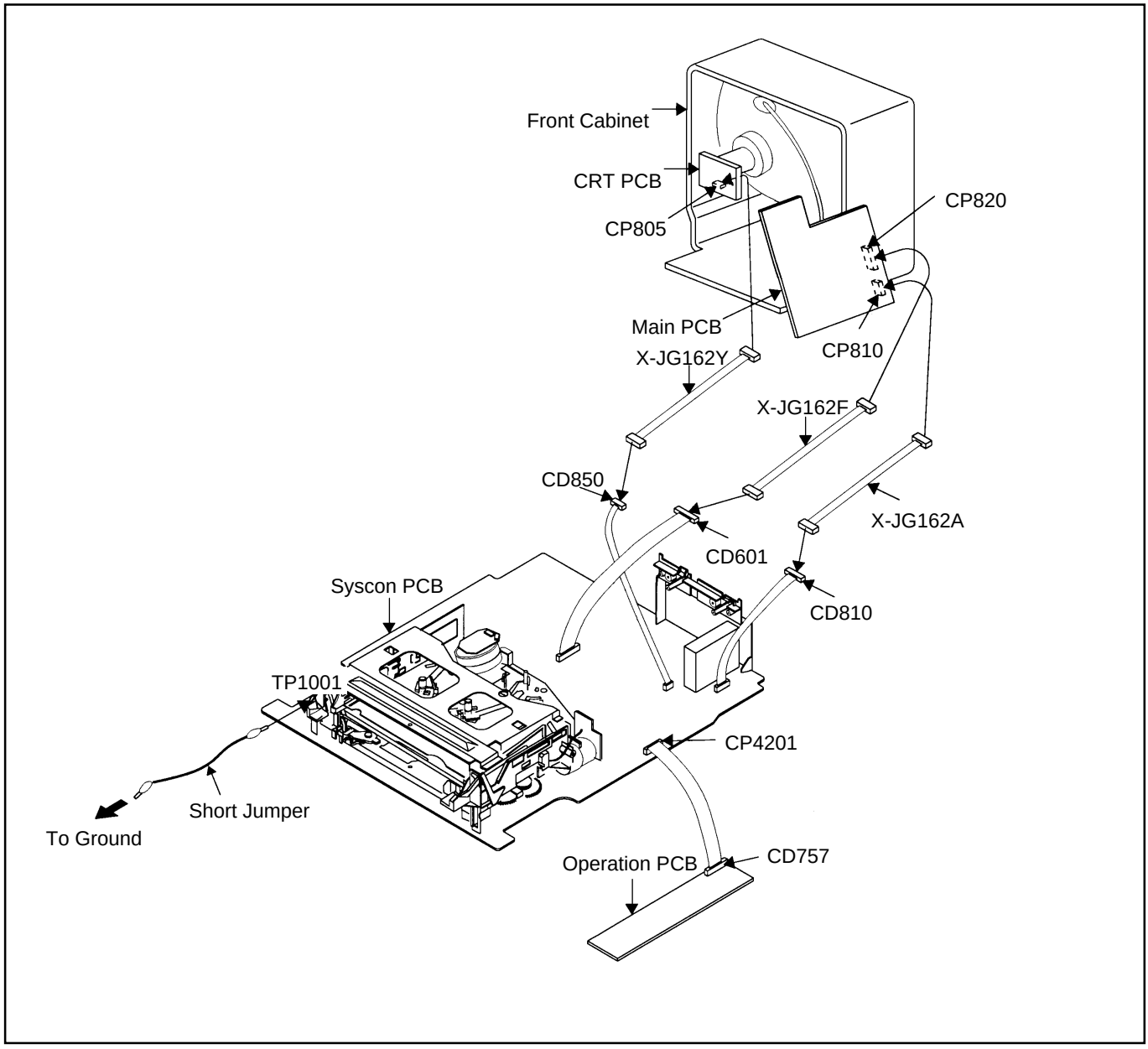
(For 4 heads model) VHS Alignment Tape MHP 	Torque Gauge 	PTU94002 Roller Driver 	X-JG153 X Value Adjustment Screwdriver
Master Plane 	Reel Disk Height Adjustment Jig 	Torque Tape 	Short Jumper 
X-JG162A Cable (8 Pins) X-JG162F Cable (13 Pins) X-JG162Y Cable (5 Pins) 	Tentelometer 		

Part No.	Remarks
MHP	Monoscope (For 4 heads model)
	Color Bar, 1KHz (For 4 heads model)
	Hi-Fi Audio (For 4 heads Hi-Fi model)
MHP	X Value Adjustment
	VSR Torque, Brake Torque (S Reel/T Reel Ass'y)
	Brake Torque (T Reel Ass'y)
	VSR Torque, Brake Torque (S Reel)
PTU94002	Guide Roller Adjustment
X-JG153	X Value Adjustment
	Reel Disk Height Adjustment
	Playback Torque, Back Tension Torque During Playback
Short Jumper	Used to connect the TP1001 and GROUND
X-JG162A/X-JG162F	Used to connect the Syscon PCB and Main PCB
X-JG162Y	Used to connect the Syscon PCB and CRT PCB

PREPARATION FOR SERVICING

Basic Servicing Position (In case of needing to check on all blocks)

1. Unplug the connector CP502, CP4201 and CP4202, then remove the TV/VCR Block from the set.
2. Unplug the connector CP810, CP820 and CP805, then remove the Main PCB from the VCR Block.
3. Connect as shown in the below figure using the Service Fixture.
   • Connect the Syscon PCB to the Main PCB with the cable X-JG162A and X-JG162F.
   • Connect the Syscon PCB to the CRT PCB with the cable X-JG162Y.
4. Remove the Operation PCB from the set, then connect it with the Syscon PCB.
   If necessary, connect CP4202 (Front A/V Jack Input Terminal)
5. Short circuit between **TP1001** and **Ground** with the Short Jumper.
   The EOT, BOT and Reel Sensor do not work at this moment.
6. At that time, the STOP/EJECT button is available to insert and eject the Cassette Tape.



MECHANICAL ADJUSTMENTS

1. CONFIRMATION AND ADJUSTMENT

Read the following NOTES before starting work.

- Place an object which weighs between 450g~500g on the Cassette Tape to keep it steady when you want to make the tape run without the Cassette Holder. (Do not place an object which weighs over 500g.)
- When you activate the deck without the Cassette Holder, short circuit between **TP1001** and **GND**. **(Refer to ELECTRICAL ADJUSTMENT PARTS LOCATION GUIDE)** In this condition the BOT/EOT/Reel Sensor will not function.

1-1: CONFIRMATION AND ADJUSTMENT OF REEL DISK HEIGHT

1. Turn on the power and set to the STOP mode.
2. Set the master plane and reel disk height adjustment jig on the mechanism framework, taking care not to scratch the drum, as shown in **Fig. 1-1-A**.
   Confirm that "A" of the reel disk is lower than "B" of the
3. reel disk height adjustment jig , and is higher than "C". If it is not enough height, adjust to 10(+0.2, -0) mm with the height adjustment washer.
4. Adjust the other reel in the same way.

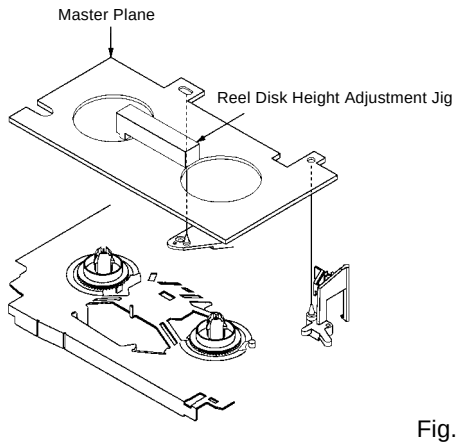


Fig. 1-1-A

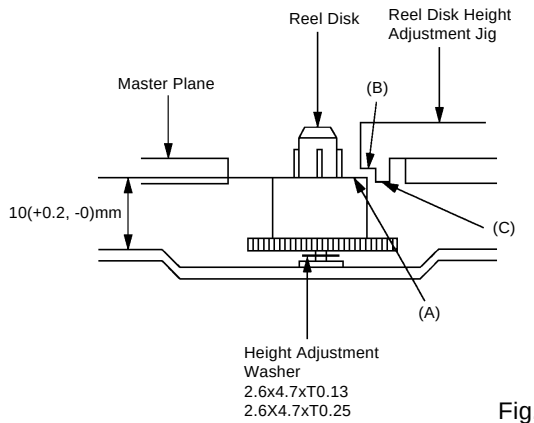


Fig. 1-1-B

1-2: CONFIRMATION AND ADJUSTMENT OF TENSION POST POSITION

1. Set to the PLAY mode.
2. Adjust the Tension Adjust until the edge of the Tension Arm is positioning within 0.5mm range from the standard line center of Main Chassis.
   After this adjustment, confirm that the cut position is located in "A" area as shown in **Fig. 1-2-B**. If it is located in "B" area, adjust again.
3. While turning the S Reel clockwise, confirm that the edge of the Tension Arm is located in the position described above.

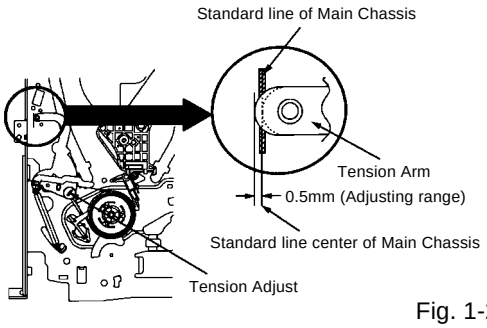


Fig. 1-2-A

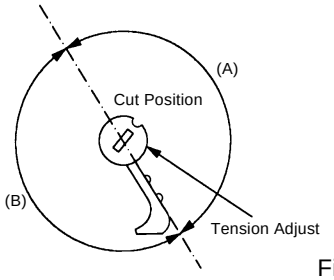


Fig. 1-2-B

1-3: CONFIRMATION OF PLAYBACK TORQUE AND BACK TENSION TORQUE DURING PLAYBACK

1. Load a video tape (T-120) recorded in standard speed mode. Set the unit to the PLAY mode.
2. Install the tentelometer as shown in **Fig. 1-3**. Confirm that the meter indicates 20 ± 2gf in the beginning of playback.

• USING A CASSETTE TYPE TORQUE TAPE

1. After confirmation and adjustment of Tension Post position **(Refer to item 1-2)**, load the cassette type torque tape and set to the PLAY mode.
2. Confirm that the right meter of the torque tape indicates 60~110gf•cm during playback in SP mode.
3. Confirm that the left meter of the torque tape indicates 25~40gf•cm during playback in SP mode.

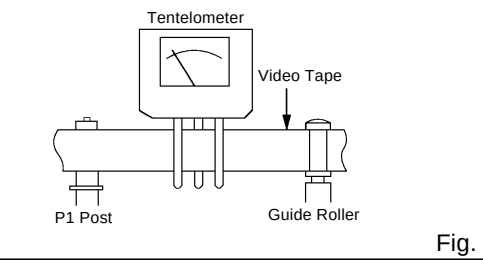


Fig. 1-3

1-4: CONFIRMATION OF VSR TORQUE

1. Operate within 4~5 seconds after the reel disk begins to turn.
2. Install the Torque Gauge on the S Reel. Set to the Rewind mode. **(Refer to Fig.1-4)**
3. Then, confirm that it indicates 120~180gf•cm.

NOTE

Install the Torque Gauge on the reel disk firmly. Press the REW button to turn the reel disk.

1-5: CONFIRMATION OF REEL BRAKE TORQUE

(S Reel Brake) **(Refer to Fig. 1-4)**

1. Set to the STOP mode.
2. Move the Idler Ass'y from the S Reel.
3. Install the Torque Gauge on the S Reel. Turn the Torque Gauge clockwise.
4. Then, confirm that it indicates 60~100gf•cm.

(T Reel Brake) **(Refer to Fig. 1-4)**

1. Set to the STOP mode.
2. Move the Idler Ass'y from the T Reel Ass'y.
3. Install the Torque Gauge on the T reel. Turn the Torque Gauge counterclockwise.
4. Then, confirm that it indicates 45~70gf•cm.

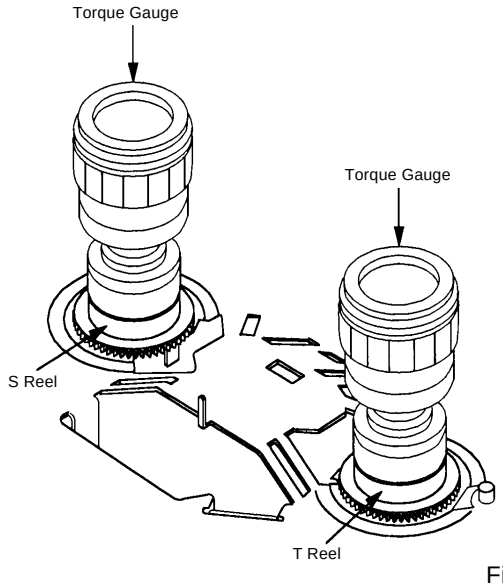


Fig. 1-4

NOTE

If the torque is out of the range, replace the following parts.

Check item	Replacement Part
1-4	Idler Ass'y/Clutch Ass'y
1-5	T Brake Spring/Tension Spring

2. CONFIRMATION AND ADJUSTMENT OF TAPE RUNNING MECHANISM

Tape Running Mechanism is adjusted precisely at the factory. Adjustment is not necessary as usual. When you replace the parts of the tape running mechanism because of long term usage or failure, the confirmation and adjustment are necessary.

2-1: GUIDE ROLLER

1. Playback the Alignment Tape **(MHP)**.
2. Connect CH-1 of the oscilloscope to **TP4001 (Envelope)** and CH-2 to **TP1002 (SW Pulse)**.
3. Press and hold the TRACKING-AUTO button on the remote control more than 2 seconds to set tracking to center.
4. Trigger with SW Pulse and observe the envelope. **(Refer to Fig. 2-1-A)**
5. When observing the envelope, adjust the Roller Driver (PTU94002) slightly until the envelope will be flat. Even if you press the Tracking Button, adjust so that flatness is not moved so much.
6. Adjust so that the A : B ratio is better than 3 : 2 as shown in **Fig. 2-1-B**, even if you press the Tracking Button to move the envelope (The envelope waveform will begin to decrease when you press the Tracking Button).
7. Adjust the Switching Point during playback. **(Refer to the ELECTRICAL ADJUSTMENTS)**

NOTE

After adjustment, confirm and adjust A/C head. **(Refer to item 2-2)**

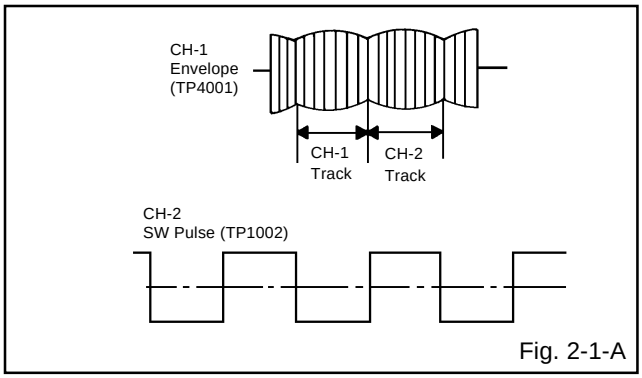


Fig. 2-1-A

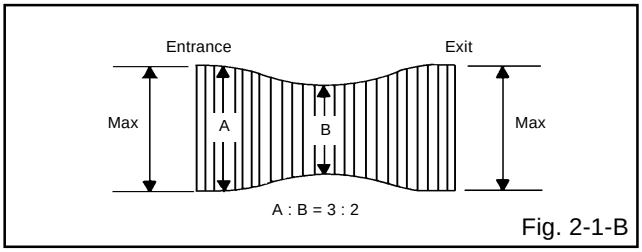


Fig. 2-1-B

2-2: CONFIRMATION AND ADJUSTMENT OF AUDIO/ CONTROL HEAD

When the Tape Running Mechanism does not work well, adjust the following items.

1. Playback the Alignment Tape **(MHP)**.
2. Confirm that the reflected picture of stamp mark is appeared on the tape prior to P4 Post as shown in **Fig. 2-2-A**.
   a) When the reflected picture is distorted, turn the screw ① clockwise until the distortion is disappeared.
   b) When the reflected picture is not distorted, turn the screw ① counterclockwise until little distortion is appeared, then adjust the a).
3. Turn the screw ② to set the audio level to maximum.
4. Confirm that the bottom of the Audio/ Control Head and the bottom of the tape is shown in **Fig. 2-2-C**.
   c) When the height is not correct, turn the screw ③ to adjust the height. Then, adjust the 1~3 again.

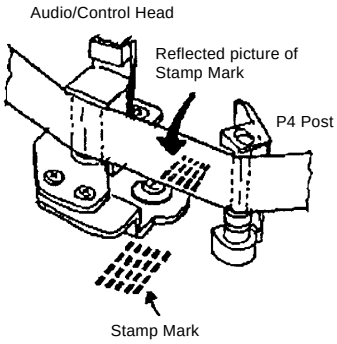


Fig. 2-2-A

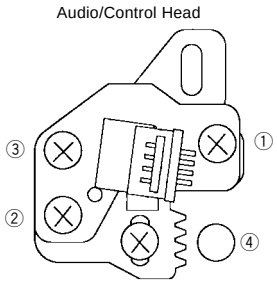


Fig. 2-2-B

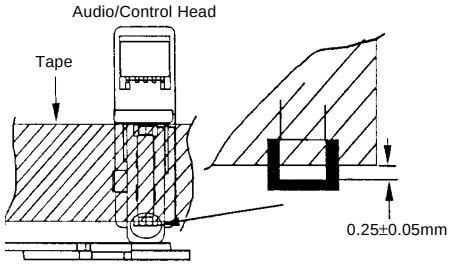


Fig. 2-2-C

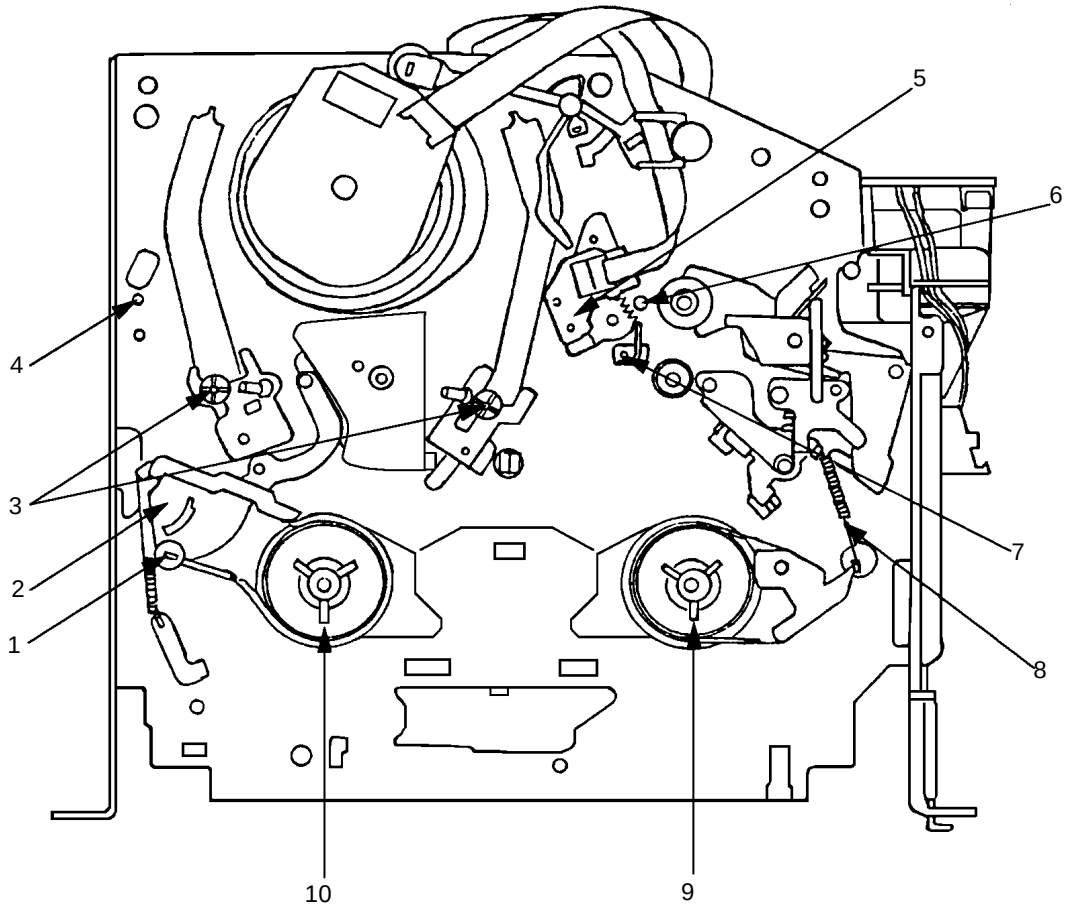
2-3: TAPE RUNNING ADJUSTMENT (X VALUE ADJUSTMENT)

1. Confirm and adjust the height of the Reel Disk. **(Refer to item 1-1)**
2. Confirm and adjust the position of the Tension Post. **(Refer to item 1-2)**
3. Adjust the Guide Roller. **(Refer to item 2-1)**
4. Confirm and adjust the Audio/Control Head. **(Refer to item 2-2)**
5. Connect CH-1 of the oscilloscope to **TP4001**, CH-2 to **TP1002** and CH-3 to **HOT side of Audio Out Jack**.
6. Playback the Alignment Tape **(MHP)**.
7. Press and hold the TRACKING-AUTO button on the remote control more than 2 seconds to set tracking to center.
8. Set the X Value adjustment driver **(X-JG153)** to the ④ of **Fig. 2-2-B**. Adjust X value so that the envelope waveform output becomes maximum.

2-4: CONFIRM HI-FI AUDIO

1. Connect CH-1 of the oscilloscope to **TP4001**, CH-2 to **TP1002** and CH-3 to the **Hi-Fi Audio Out Jack**.
2. Playback the VHS Alignment Tape. **(Refer to SERVICING FIXTURE AND TOOLS)**
3. Press and hold the Tracking-Auto button on the remote control more than 2 seconds to set tracking to center.
4. Press the Tracking Up button and count number of steps which the audio output is changed from Hi-Fi to MONO.
5. Press the Tracking Down button and count number of steps which the audio output is changed from Hi-Fi to MONO.
6. Confirm that the difference between these counted steps number in the above items are within 2 steps. If the difference are more than 3 steps, do Tape Running Adjustment again. **(Refer to item 2-3)**

3. MECHANISM ADJUSTMENT PARTS LOCATION GUIDE



1. Tension Adjust
2. Tension Arm
3. Guide Roller
4. P1 Post
5. Audio/Control Head
6. X value adjustment driver hole
7. P4 Post
8. T Brake Spring
9. T Reel
10. S Reel

1. ADJUSTMENT PROCEDURE

Read and perform these adjustments when repairing the circuits or replacing electrical parts or PCB assemblies.

CAUTION

- Use an isolation transformer when performing any service on this chassis.
- Before removing the anode cap, discharge electricity because it contains high voltage.
- When removing a PCB or related component, after unfastening or changing a wire, be sure to put the wire back in its original position.
  Inferior silicon grease can damage IC's and transistors.
- When replacing IC's and transistors, use only specified silicon grease.
  Remove all old silicon before applying new silicon.

On-Screen Display Adjustment

1. Unplug the AC plug for more than 5 seconds to set the clock to the non-setting state. Then, set the volume level to minimum.
2. Press the VOL. DOWN button on the set and the channel button **(9)** on the remote control simultaneously to display adjustment mode on the screen as shown in **Fig. 1-1**.

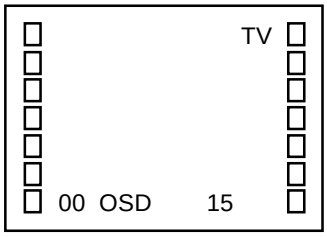


Fig. 1-1

3. Use the Channel UP/DOWN button or Channel button **(0-9)** on the remote control to select the options shown in **Fig. 1-2**.
4. Press the MENU button on the remote control to end the adjustments.

NO.	FUNCTION	NO.	FUNCTION
00	OSD H	13	BRIGHTNESS
01	CUT OFF	14	CONTRAST
02	RF DELAY	15	COLOR
03	VIF VCO	16	TINT
04	H VCO	17	SHARPNESS
05	H PHASE	18	FM LEVEL
06	V SIZE	19	LEVEL
07	V SHIFT	20	SEPARATION 1
08	R DRIVE	21	SEPARATION 2
09	B DRIVE	22	TEST MONO
10	R CUT OFF	23	TEST STEREO
11	G CUT OFF	24	X-RAY TEST
12	B CUT OFF		

Fig. 1-2

2. BASIC ADJUSTMENTS (VCR SECTION)

2-1: PG SHIFTER

1. Connect CH-1 on the oscilloscope to **TP1002** and CH-2 to **TP4201**.
2. Playback the alignment tape.
3. Press and hold the Tracking-Auto button on the remote control more than 2 seconds to set tracking to center.
4. Press the VOL. DOWN button on the set and the channel button **(3)** on the remote control simultaneously until the indicator REC disappears. If the indicator REC disappears, adjustment is completed.

(If the above adjustments doesn't work well:)

5. Press the VOL. DOWN button on the set and the channel button **(3)** on the remote control simultaneously until the indicator REC disappears.
6. When the REC indicator is blinking, press both VOL. DOWN button on the set and the channel button **(4)** on the remote control simultaneously and adjust the Tracking +/- button until the arising to the down of Head Switching Pulse becomes 6.5 ± 0.5H.
   (Refer to Fig. 2-1-A, B)
7. Press the Tracking Auto button.

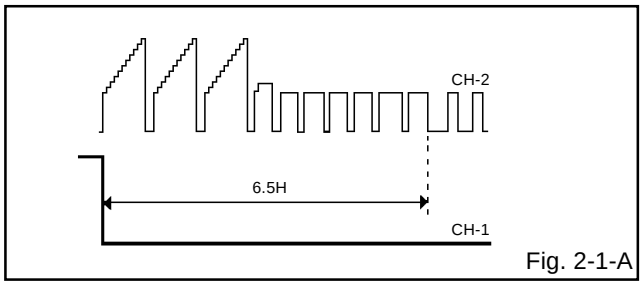


Fig. 2-1-A

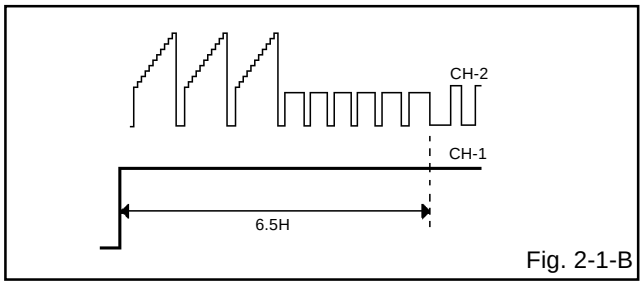


Fig. 2-1-B

2-2: VCO FREERUN

1. Place the set with Aging Test for more than 10 minutes.
2. Connect the digital voltmeter between the **pin 7 of CP602** and the **pin 1 (GND) of CP602**.
3. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(03)** on the remote control to select "VIF VCO".
4. Press the VOL. UP/DOWN button on the remote control until the digital voltmeter is 2.5V.

2-3: RF AGC

1. Receive the VHF HIGH (70dB).
2. Connect the digital voltmeter between the **pin 5 of CP602** and the **pin 1 (GND) of CP602**.
3. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(02)** on the remote control to select "RF DELAY".
4. Press the VOL. UP/DOWN button on the remote control until the digital voltmeter is 2.6 ± 0.05V.

2-4: STEREO SEPARATION

1. Receive the stereo signal. (L=2KHz, R=400Hz)
2. Connect the AC voltmeter to **AUDIO OUT L/R** through stereo filter (L=400Hz, R=2KHz).
3. Press the AUDIO SELECT button on the remote control to set to the stereo mode.
4. Adjust by the **VR6001** so that the difference between with the stereo filter and without the stereo filter is more than 23dB.

(TV SECTION)

2-5: CONSTANT VOLTAGE

1. Connect the digital voltmeter to the **FUSE HOLDER of FH503**.
2. Set condition is AV MODE without signal.
3. Adjust the **VR502** until the DC voltage is 111 ± 0.5V.

2-6: OSD HORIZONTAL

1. Activate the adjustment mode display of **Fig. 1-1**.
2. Press the VOL. UP/DOWN button on the remote control until the difference of A and B becomes minimum. **(Refer to Fig. 2-3)**

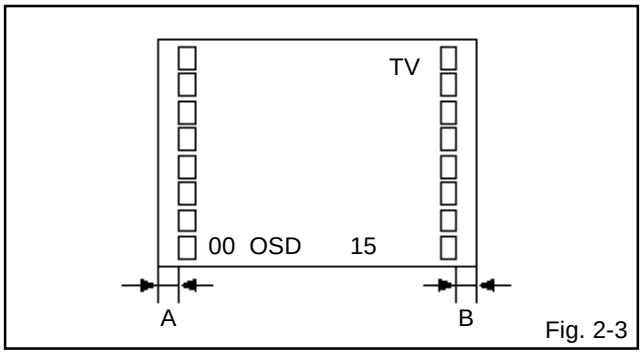


Fig. 2-3

2-7: CUT OFF

1. Adjust the unit to the following settings.
   R CUT OFF=128, G CUT OFF=128, B CUT OFF=128, R DRIVE=64, B DRIVE=64, BRIGHTNESS=128, CONTRAST=100
2. Place the set with Aging Test for more than 15 minutes.
3. Set condition is AV MODE without signal.
4. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(01)** on the remote control to select "CUT OFF".
5. Adjust the **Screen Volume** until a dim raster is obtained.

2-8: WHITE BALANCE

NOTE: Adjust after performing CUT OFF adjustment.

1. Place the set with Aging Test for more than 15 minutes.
2. Receive the color bar pattern.
3. Using the remote control, set the brightness and contrast to normal position.
4. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(10)** on the remote control to select "R CUT OFF".
5. Using the VOL. UP/DOWN button on the remote control, adjust the R CUT OFF.
6. Press the CH. UP/DOWN button on the remote control to select the "R DRIVE", "B DRIVE", "G CUT OFF" or "B CUT OFF".
7. Using the VOL. UP/DOWN button on the remote control, adjust the R DRIVE, B DRIVE, G CUT OFF or B CUT OFF.
8. Perform the above adjustments 6 and 7 until the white color is looked like a white.

2-9: FOCUS

1. Receive the monoscope pattern.
2. Turn the Focus Volume fully counterclockwise once.
3. Adjust the **Focus Volume** until picture is distinct.

2-10: HORIZONTAL PHASE

1. Receive the monoscope pattern.
2. Using the remote control, set the brightness and contrast to normal position.
3. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(05)** on the remote control to select "H PHASE".
4. Press the VOL. UP/DOWN button on the remote control until the SHIFT quantity of the OVER SCAN on right and left becomes minimum.

2-11: HORIZONTAL SIZE

NOTE: Adjust after performing adjustments in section 2-10.

1. Receive the monoscope pattern.
2. Adjust the **VR401** until the SHIFT quantity of the OVER SCAN on right and left becomes 10 ± 2%.

2-12: VERTICAL SIZE

NOTE: Adjust after performing adjustments in section 2-11.

1. Receive the cross hatch signal from the Pattern Generator.
2. Using the remote control, set the brightness and contrast to normal position.
3. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(06)** on the remote control to select "V SIZE".
4. Press the VOL. UP/DOWN button on the remote control until the rectangle on the center of the screen becomes square.
5. Receive a broadcast and check if the picture is normal.

2-13: VERTICAL SHIFT

NOTE: Adjust after performing adjustments in section 2-12.

1. Receive the center cross signal from the Pattern Generator.
2. Using the remote control, set the brightness and contrast to normal position.
3. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(07)** on the remote control to select "V SHIFT".
4. Press the VOL. UP/DOWN button on the remote control until the horizontal line becomes fit to the notch of the shadow mask.

2-14: SUB BRIGHTNESS

1. Receive the black pattern*. (RF Input)
2. Using the remote control, set the brightness and contrast to normal position.
3. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(13)** on the remote control to select "BRIGHTNESS".
4. Press the VOL. UP/DOWN button on the remote control until the screen begin to shine.
5. Receive the black pattern*. (Audio Video Input)
6. Press the INPUT button on the remote control to set to the AV mode. Then perform the above adjustments 2~4.

*The Black Pattern means the whole black raster signal. Select the "RASTER" of the pattern generator, set to the OFF position for each R, G and B.

2-15: SUB CONTRAST

1. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(14)** on the remote control to select "CONTRAST".
2. Press the VOL. UP/DOWN button on the remote control until the contrast step No. becomes "86"
3. Press the INPUT button on the remote control to set to the AV mode.
4. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(14)** on the remote control to select "CONTRAST".
5. Press the VOL. UP/DOWN button on the remote control until the contrast step No. becomes "89"

2-16: SUB TINT

1. Receive the color bar pattern. (RF Input)
2. Using the remote control, set the brightness, contrast, color and tint to normal position.
3. Connect the synchro scope to **TP806**.
4. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(16)** on the remote control to select "TINT".
5. Press the VOL. UP/DOWN button on the remote control until the section "A" becomes a straight line. **(Refer to Fig. 2-4)**
6. Increase the step numbers "3" steps with the VOL. UP button on the remote control.
7. Receive the color bar pattern. (Audio Video Input)
8. Press the INPUT button on the remote control to set to the AV mode. Then perform the above adjustments 2~6.

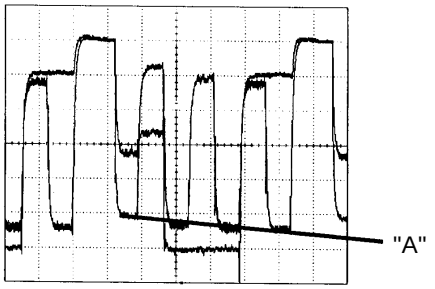


Fig. 2-4

2-17: SUB COLOR

1. Receive the color bar pattern. (RF Input)
2. Using the remote control, set the brightness, contrast, color and tint to normal position.
3. Connect the synchro scope to **TP804**.
4. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(15)** on the remote control to select "COLOR".
5. Adjust the VOLTS RANGE VARIABLE knob of the oscilloscope until the range between white 100% and 0% is set to 4 scales on the screen of the oscilloscope.
6. Press the VOL. UP/DOWN button on the remote control until the red color level is adjusted to 125 ± 5% of the white level. **(Refer to Fig. 2-5)**
7. Receive the color bar pattern. (Audio Video Input)
8. Press the INPUT button on the remote control to set to the AV mode. Then perform the above adjustments 2~6.

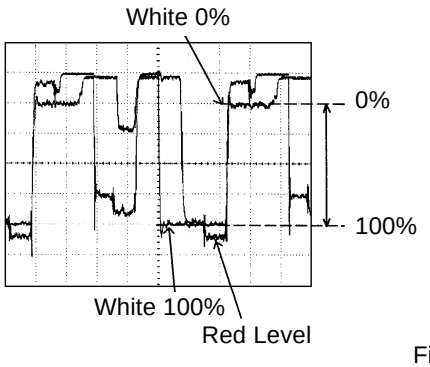
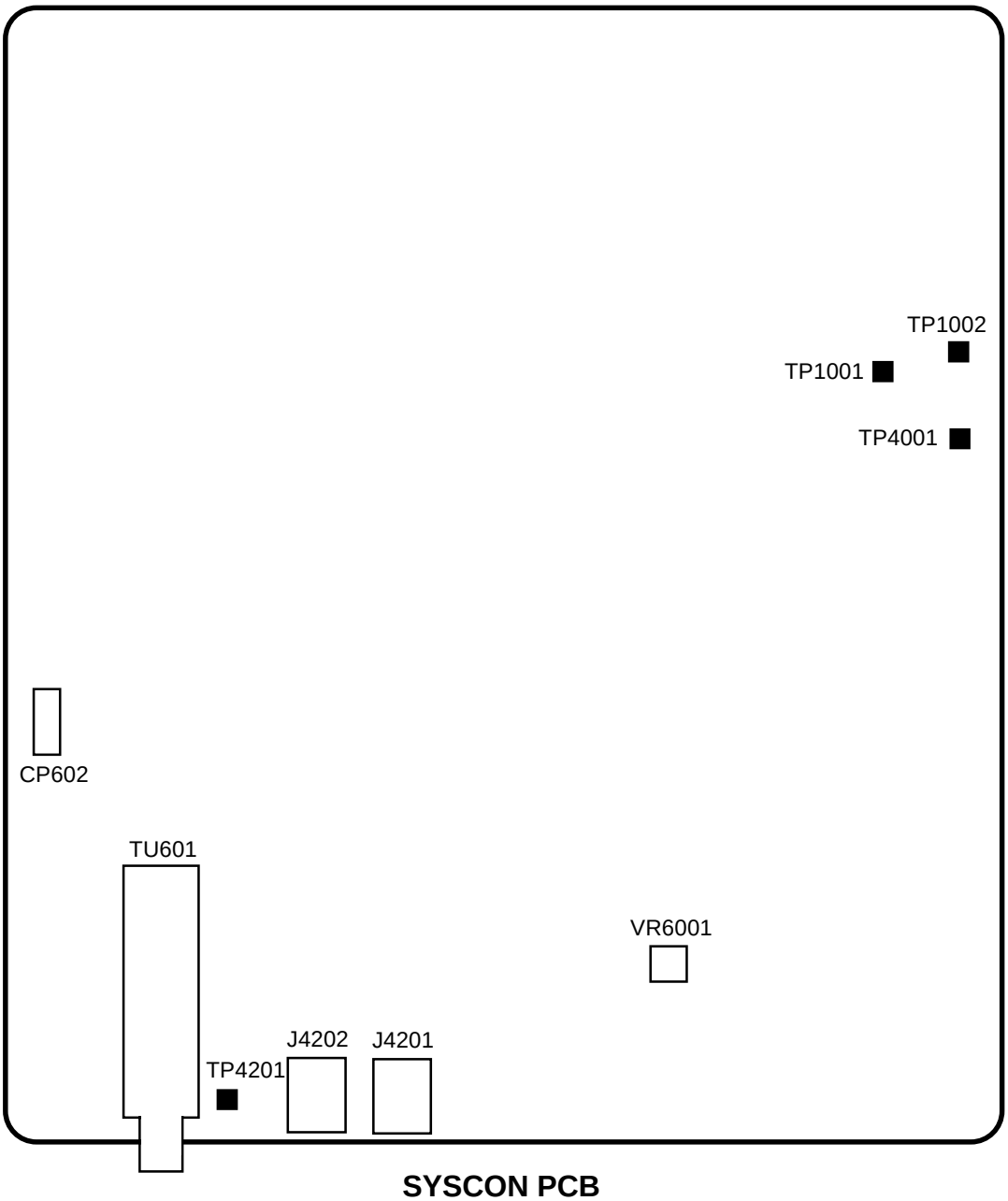


Fig. 2-5

2-18: PIN CUSHION (PCC)

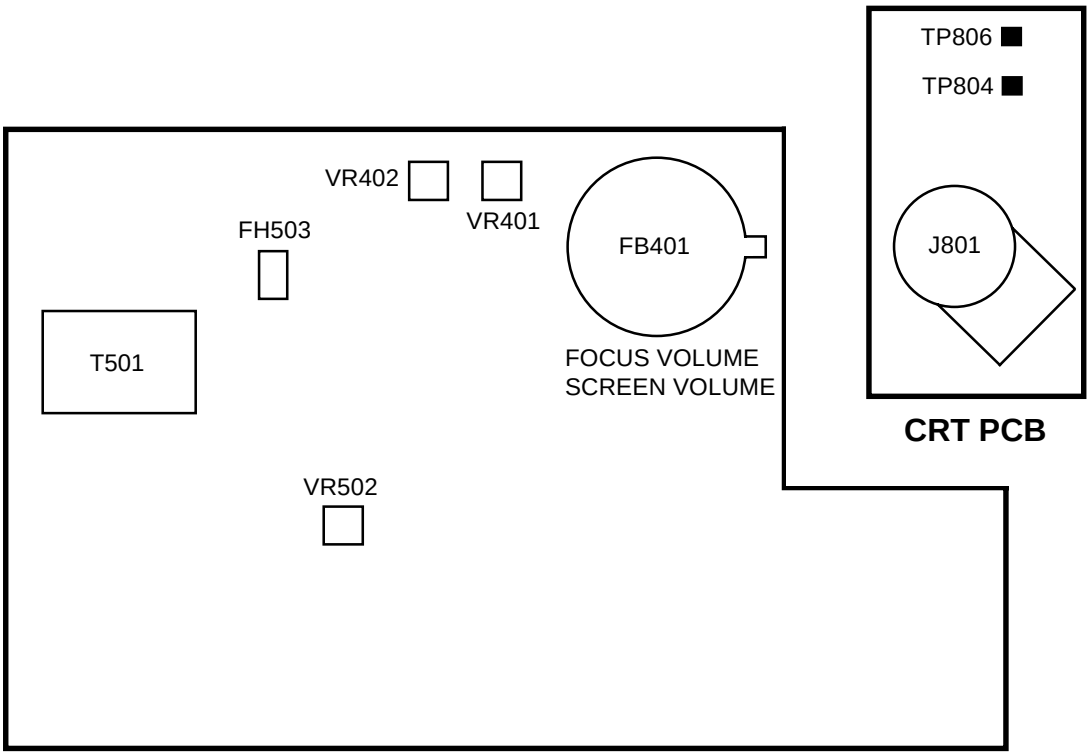
1. Receive the color bar pattern.
2. Using the remote control, set the brightness and contrast to normal position.
3. Adjust the **VR402** until the right and left vertical line becomes straight.

3. ELECTRICAL ADJUSTMENT PARTS LOCATION GUIDE
(VCR SECTION)



SYSCON PCB

(TV SECTION)



CRT PCB

MAIN PCB

4. PURITY AND CONVERGENCE ADJUSTMENTS

NOTE

1. Turn the unit on and let it warm up for at least 30 minutes before performing the following adjustments.
2. Place the CRT surface facing east or west to reduce the terrestrial magnetism.
3. Turn ON the unit and demagnetize with a Degauss Coil.

4-1: STATIC CONVERGENCE (ROUGH ADJUSTMENT)

1. Tighten the screw for the magnet. Refer to the adjusted CRT for the position. **(Refer to Fig. 4-1)**
   If the deflection yoke and magnet are in one body, untighten the screw for the body.
2. Receive the green raster pattern from the color bar generator.
3. Slide the deflection yoke until it touches the funnel side of the CRT.
4. Adjust center of screen to green, with red and blue on the sides, using the pair of purity magnets.
5. Switch the color bar generator from the green raster pattern to the crosshatch pattern.
6. Combine red and blue of the 3 color crosshatch pattern on the center of the screen by adjusting the pair of 4 pole magnets.
7. Combine red/blue (magenta) and green by adjusting the pair of 6 pole magnets.
8. Adjust the crosshatch pattern to change to white by repeating steps 6 and 7.

4-2: PURITY

NOTE

Adjust after performing adjustments in section 4-1.

1. Receive the green raster pattern from color bar generator.
2. Adjust the pair of purity magnets to center the color on the screen.
   Adjust the pair of purity magnets so the color at the ends are equally wide.
3. Move the deflection yoke backward (to neck side) slowly, and stop it at the position when the whole screen is green.
4. Confirm red and blue colors.
5. Adjust the slant of the deflection yoke while watching the screen, then tighten the fixing screw.

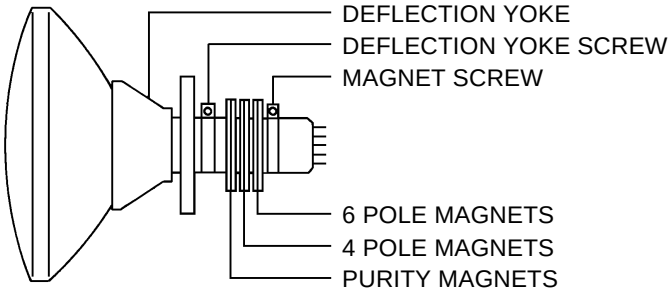


Fig. 4-1

4-3: STATIC CONVERGENCE

NOTE

Adjust after performing adjustments in section 4-2.

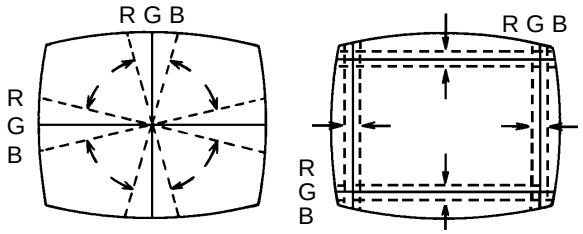
1. Receive the crosshatch pattern from the color bar generator.
2. Combine red and blue of the 3 color crosshatch pattern on the center of the screen by adjusting the pair of 4 pole magnets.
3. Combine red/blue (magenta) and green by adjusting the pair of 6 pole magnets.

4-4: DYNAMIC CONVERGENCE

NOTE

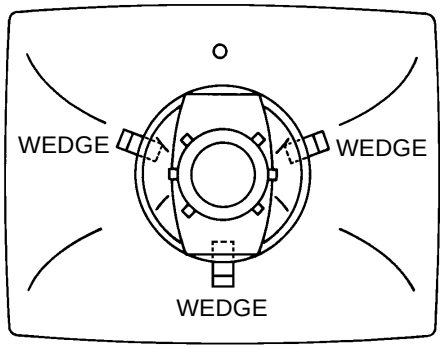
Adjust after performing adjustments in section 4-3.

1. Adjust the differences around the screen by moving the deflection yoke upward/downward and right/left.
   (Refer to Fig. 4-2-a)
2. Insert three wedges between the deflection yoke and CRT funnel to fix the deflection yoke.
   (Refer to Fig. 4-2-b)



UPWARD/DOWNWARD SLANT RIGHT/LEFT SLANT

Fig. 4-2-a



WEDGE POSITION

Fig. 4-2-b

GUIDE FOR REPAIRING

IC DESCRIPTION

SYSCON PCB OEC7043C (IC1001)

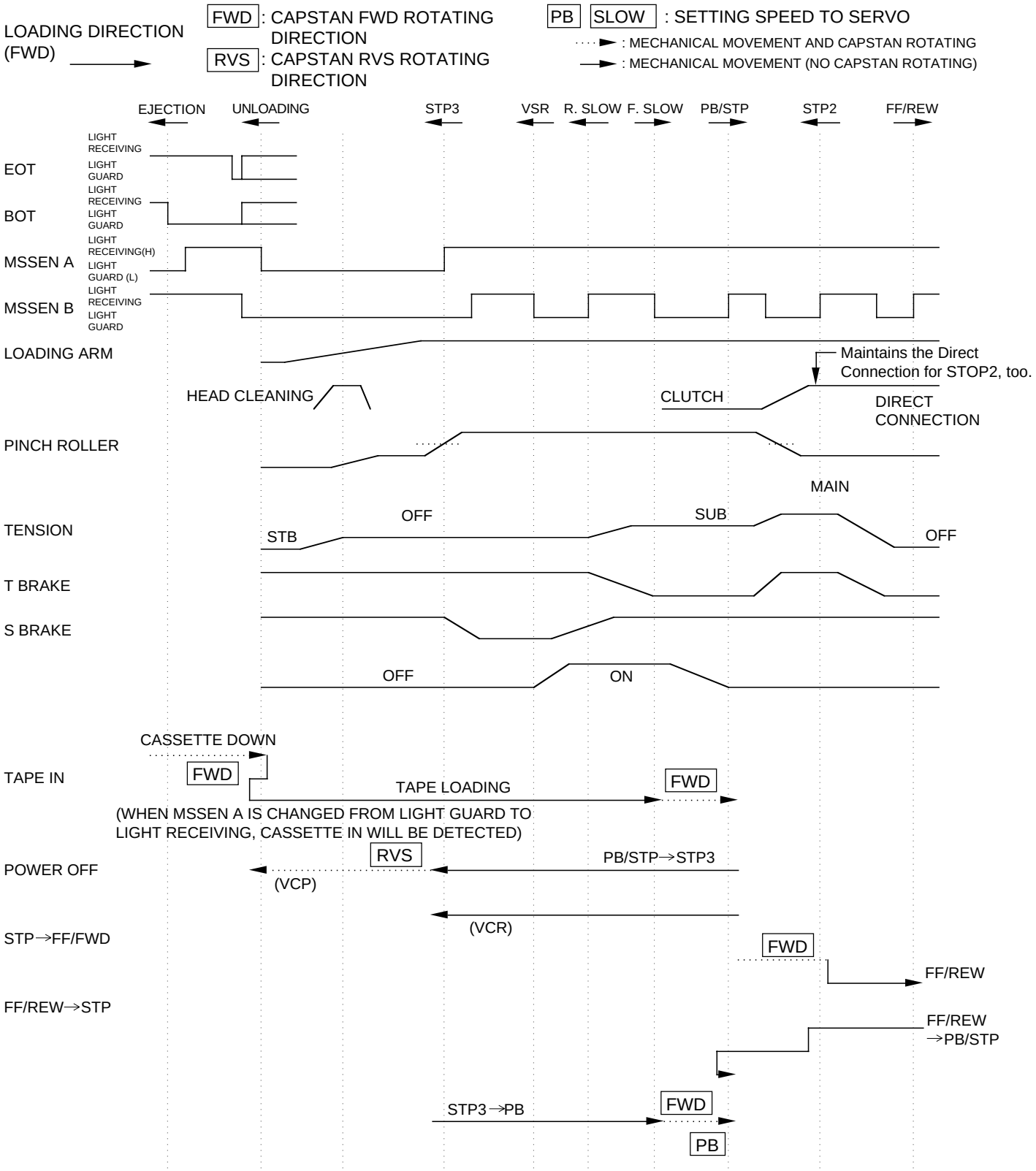
PIN NO.	PIN NAME	I/O	DESCRIPTION
1	MSSEN A	I	Input terminal of mecha state sensor.
2	MSSEN B	I	
3	EOT	I	Tape end sensor input signal.
4	BOT	I	Tape start sensor input signal.
5	HI-FI ENV	I	Input terminal of Hi-Fi RF envelope.
6	VIDEO ENV	I	Input terminal of video RF envelope.
7	AFT	I	Input terminal of AFT.
8	X-RAY	I	X-RAY detection input.
9	KEY 1	I	Main unit key input.
10	KEY 2	I	
11	CAPSTAN FWD	O	Capstan forward and backward command. (forward "L" output)
12	CAPSTAN LIMIT	O	Switch the maximum output current of the Capstan Motor.
13	DUMMY V.SYNC	O	Virtual V Pulse output.
14	REMOCON IN	I	Receive the remote control signal.
15	COLOR ROTARY	O	Color Rotary Control output.
16	HEAD AMP.SW	O	Switching output of Head Amp SW on 4 heads.
17	ENV COMP IN	I	Comparison results input of Playback Envelope level ON SP/LP heads (4heads)
18	VIDEO HEAD SW	O	Output terminal of Head SW to Y/C/A and Head Amp.
19	HI-FI HEAD SW	O	Output terminal of audio Head SW to Y/C/A and Head Amp.
20	LDM RVS	O	Output signal to control the rotation direction of the loading motor.
21	LDM FWD	O	
22	DEGAUSS-H	O	Degauss control output
23	MSSENS CTL	O	MSSEN sensor LED.
24	SP-H	O	Output HIGH at tape speed SP.
25	IIC OFF	I	When input "L" the I2CBUS communication is stopped.
26	EXT MUTE	O	Mute signal of external video mute.
27	VCR POWER	O	VCR power output.
28	TV POWER	O	TV power output.
29	T-REC LED	O	T-REC indication LED output.
30	REC LED	O	REC indication LED output.
31	ON TIMER LED	O	ON-TIMER indication LED output.
32	OTPB LED	O	OTPB indication LED output.
33	INPUT SELECT	O	Output terminal for internal/external switching control.
34	RESET	I	RESET will be done when the voltage goes to HIGH after the reset signal.
35	XCIN	I	Subclock pulse (32kHz)
36	XCOUT	O	
37	VCC	-	5V
38	XIN	I	Connect the main crystal (10MHz)
39	XOUT	O	
40	VSS	-	Ground.
41	X-RAY TEST	O	X-RAY test output
42	CS REC LED	O	CS REC indication LED output.
43	CLKSEL	I	5V
44	OSC IN	I	Terminal to connect the OSD circuit.
45	OSC OUT	O	Terminal to connect the OSD circuit.
46	NUB	-	Ground.
47	AV 1	O	Not used.
48	AV 2	O	Not used.
49	OSD VSS	-	Ground.
50	TAB SW	I	Input terminal for judge the tape if it has TAB or not.
51	SERVICE	I	Input terminal for Service Mode.
52	SD IN	I	Not used.

SYSCON PCB OEC7043C (IC1001)

PIN NO.	PIN NAME	I/O	DESCRIPTION
53	OSD VCC	-	5V
54	HLF	-	Filter connection for HLF.
55	VHOLD	-	Condenser connection for VHOLD.
56	CVIN	I	Composite Video input terminal.
57	NUA	-	Ground.
58	H SYNC	I	Input terminal for H-SYNC.
59	V SYNC	I	Input terminal for V-SYNC.
60	OSD OUT 1	O	Blanking output terminal of OSD.
61	REC-H/EE-M/PB-L	O	Output terminal for Y/C IC control.
62	B	O	Color signal blue output.
63	G	O	Color signal green output.
64	R	O	Color signal red output.
65	CAPSTAN FULL	O	Output the HIGH during the acceleration force of capstan motor at SLOW mode.
66	V REC START H	O	On control of A/V recording (Whole width erase) circuit.
67	YC DOC/XO CTL	O	DOC/XO switching terminal of Y/C.
68	CENTER LED	O	CENTER indication LED output.
69	TRICK PB/EE-H	O	Special effect playback.(CUE/REVIEW/STILL/SLOW etc)
70	TRICK PB-H	O	
71	CLK 1	O	CLOCK terminal for I2C BUS communication.
72	DATA 1	I/O	DATA terminal for I2C BUS communication.
73	FF/REW-L	O	The output terminal of to that switches the frequency characteristic of CTL by the circuit bill outside.
74	JUST CLOCK	I	Input terminal for JUST CLOCK.
75	AGC	O	Not used.
76	CAPSTAN PWM	O	PWM output of Capstan control.
77	DRUM PWM	O	PWM output of Cylinder control.
78	PLAY LED	O	PLAY indication LED output.
79	REEL S	I	Input terminal of reel sensor supply.
80	REEL T	I	Input terminal of reel sensor take up.
81	VCR MUTE	O	Mute signal of audio mute. (VCR)
82	TV MUTE	O	Mute signal of audio mute. (TV)
83	SP-L/LP-M/EP-H	O	Output terminal for tape speed control at playback and recording.
84	CA/MA SEL	O	Not used.
85	POWER FAIL	I	Input for the detection of power interruption.
86	CPFGAMP OUT	O	Output terminal for CAPSTAN FG signal detection.
87	CAPSTAN FG	I	Input terminal for CAPSTAN FG signal detection.
88	AMP VSS	-	Ground.
89	DRUM FG	I	Input terminal for DRUM FG signal detection.
90	DRUM PG	I	Input terminal for DRUM PG signal detection.
91	AMP VREFOUT	O	Condenser connection for AMP-VREFOUT.
92	AMP VREFIN	I	Condenser connection for AMP-VREFIN.
93	C	I	Condenser connection for C.
94	CTL-	I/O	Input and output terminal of Control Head.
95	CTL+	I/O	Input terminal of Control Head.
96	AMP C	-	Condenser connection for AMP C.
97	CTL AMP OUT	O	Output terminal for amp out.
98	AMPVCC	-	5V
99	ANALOG VCC	-	5V
100	DEW(mono)	I	Input terminal for the detection with the dew of the cylinder.
100	STEREO SEL(HiFi)	I	Input terminal for the judgement of voice reception condition.

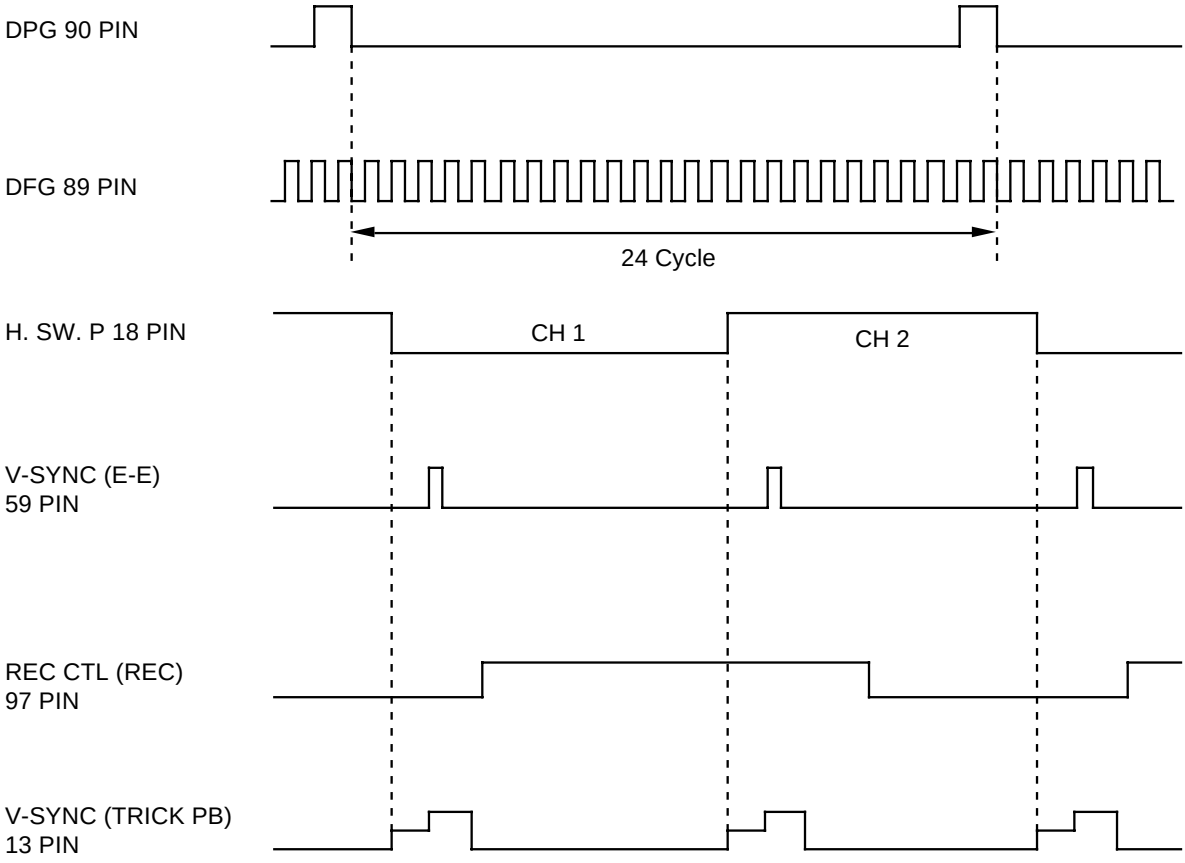
- The assignment for Pin 100 is varies according to the SET which is MONO or Hi-Fi.
  It is used for DEW terminal in MONO and STEREO SEL terminal in Hi-Fi.

MECHANISM TIMING CHART



SERVO TIMING CHART

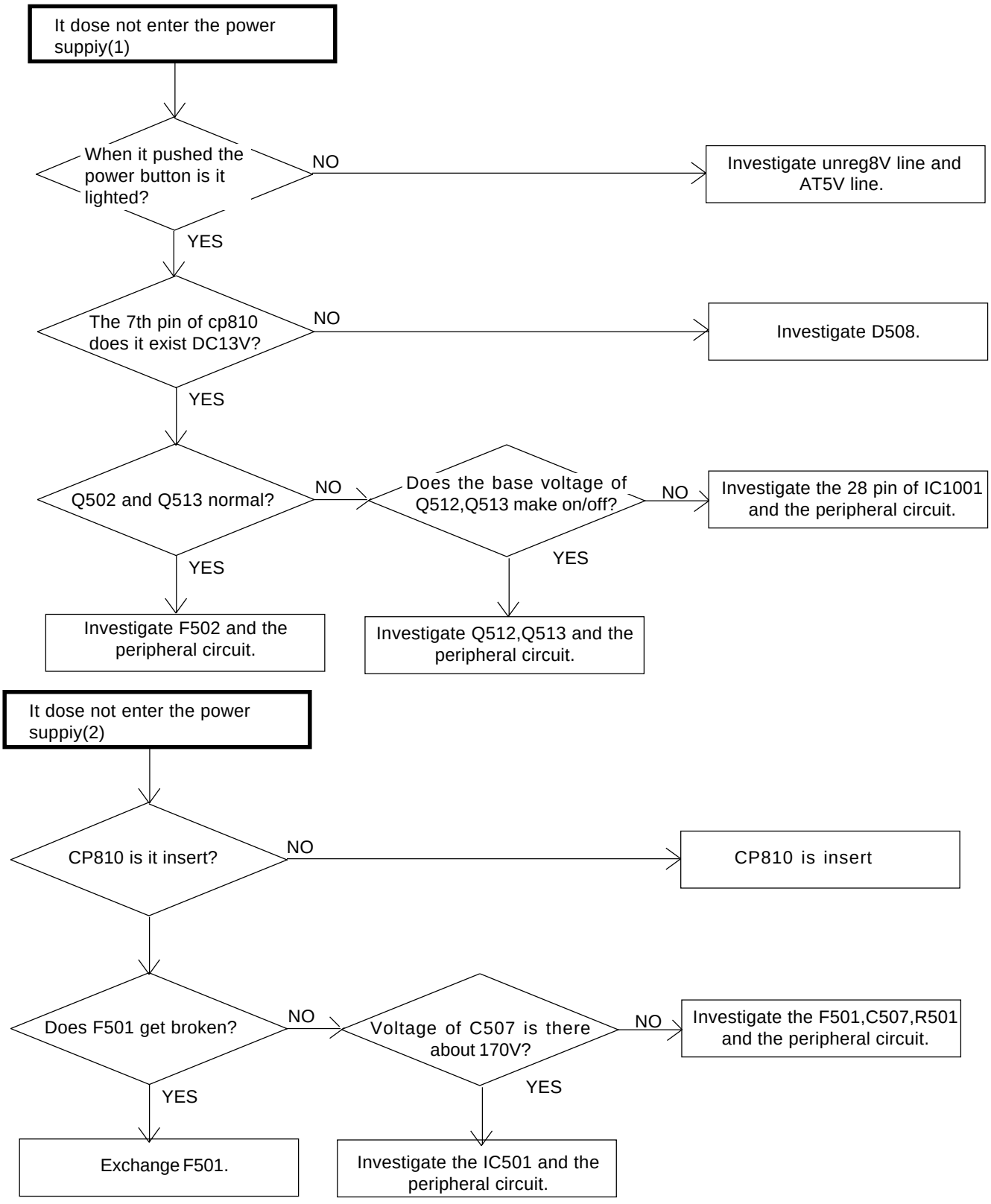
SYSCON PCB IC1001 (OEC7043C)

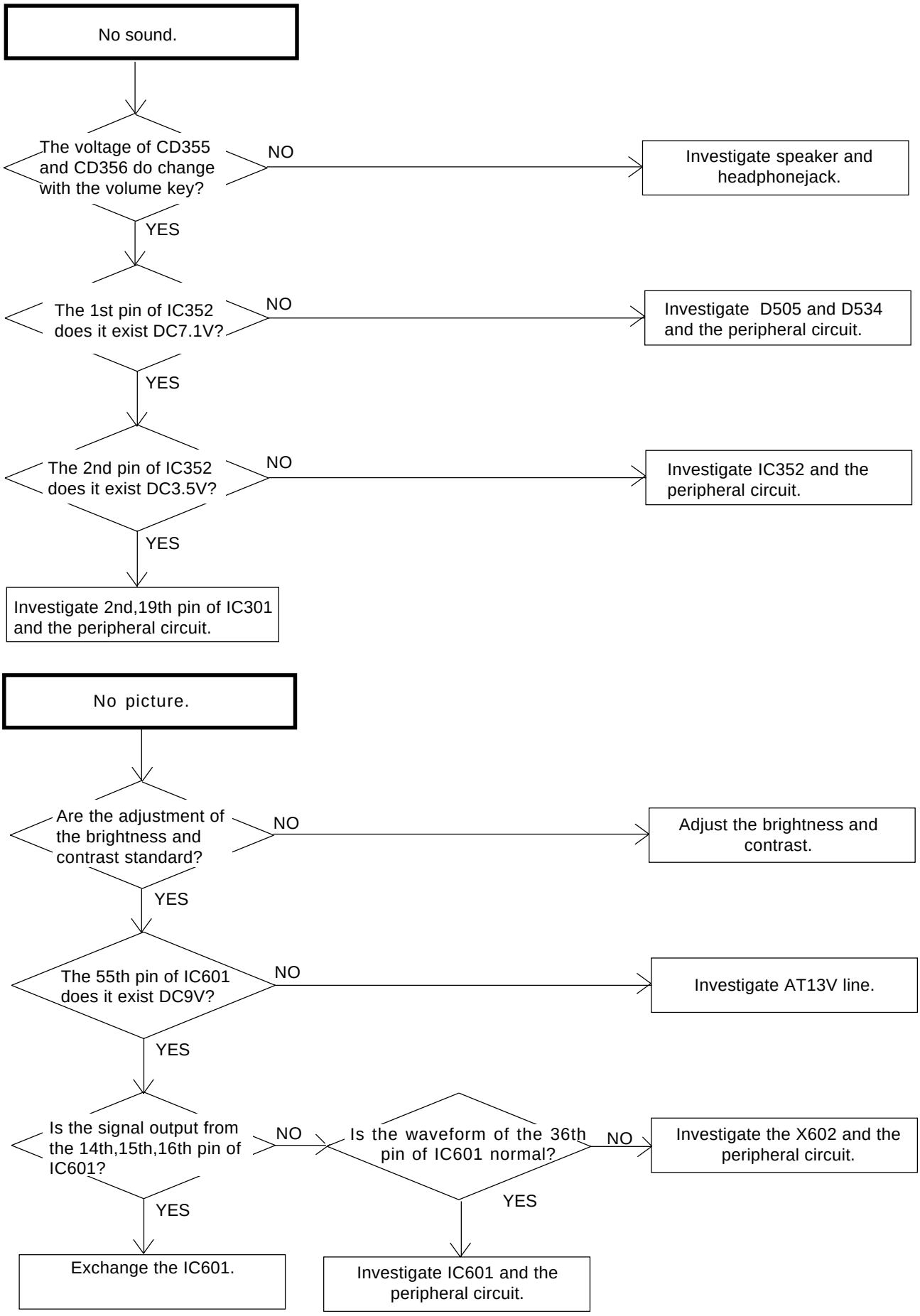


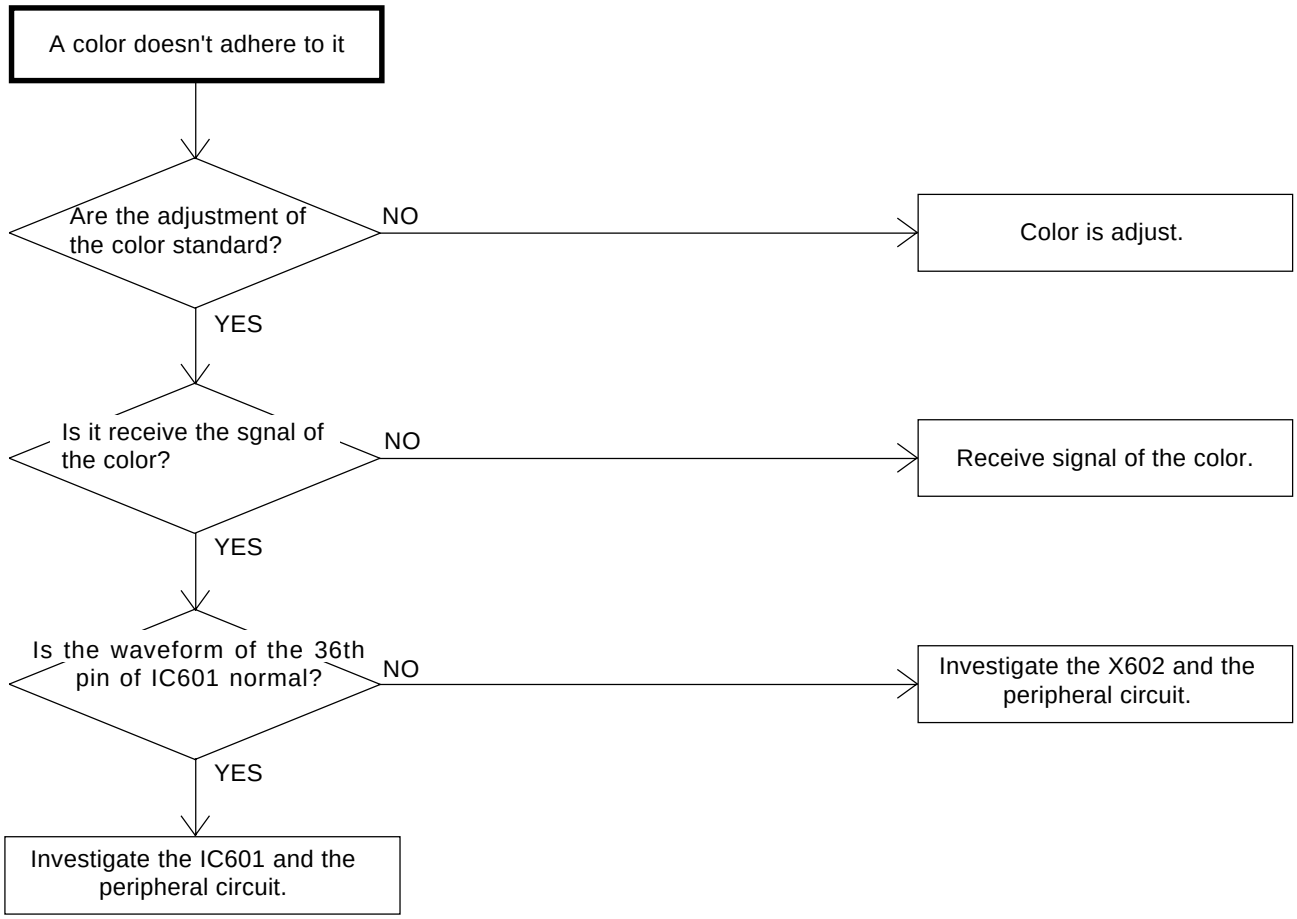
• WAVEFORM CHANGES DEPENDED ON THE TAPE SPEED

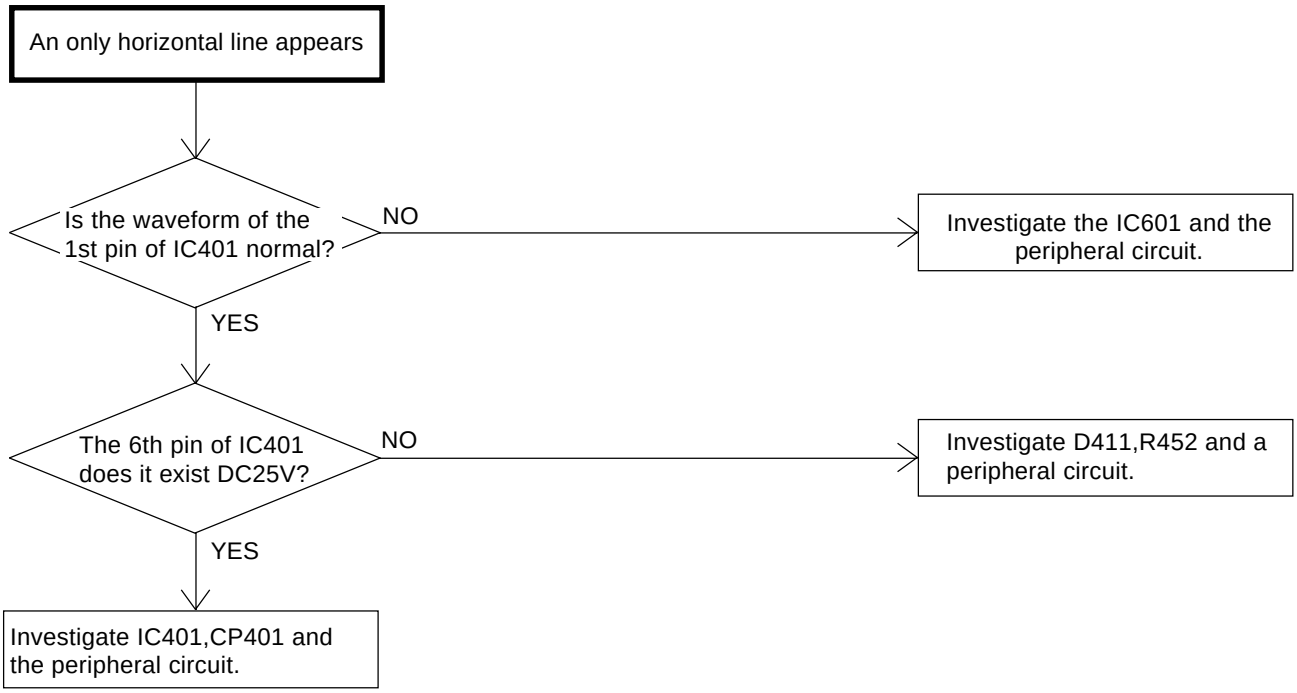
TROUBLESHOOTING GUIDE

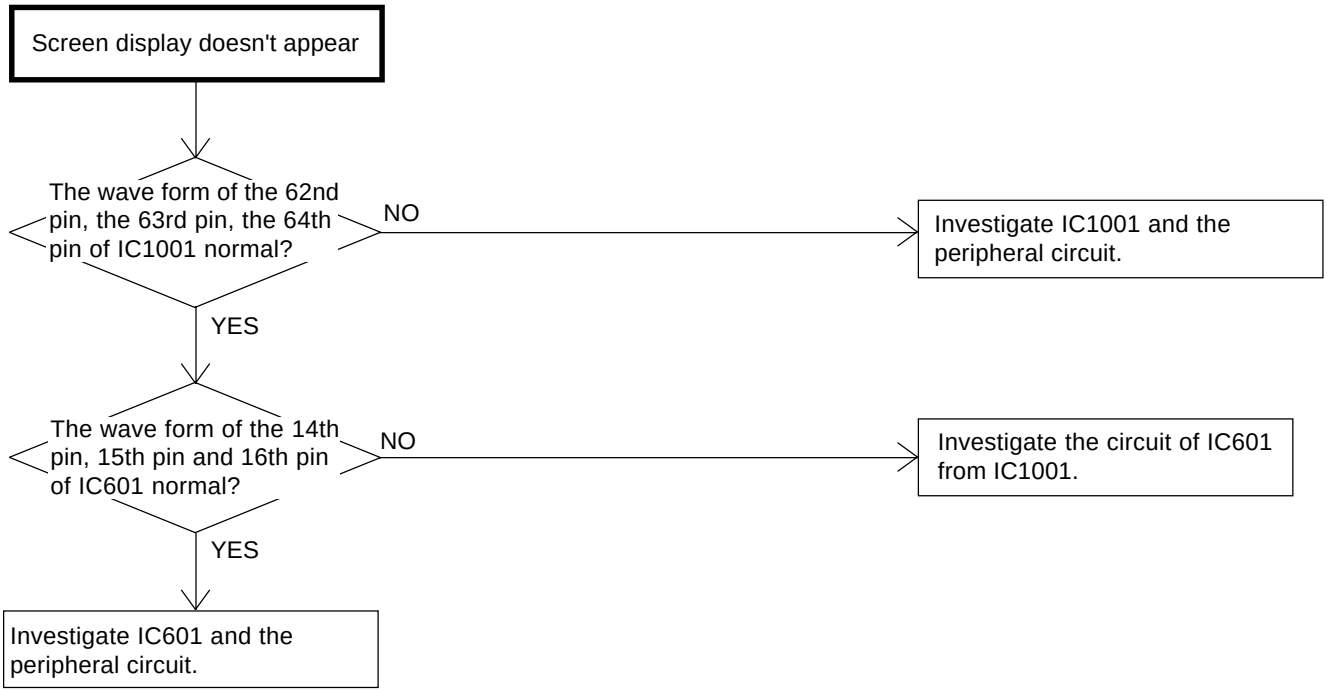
(Television division)



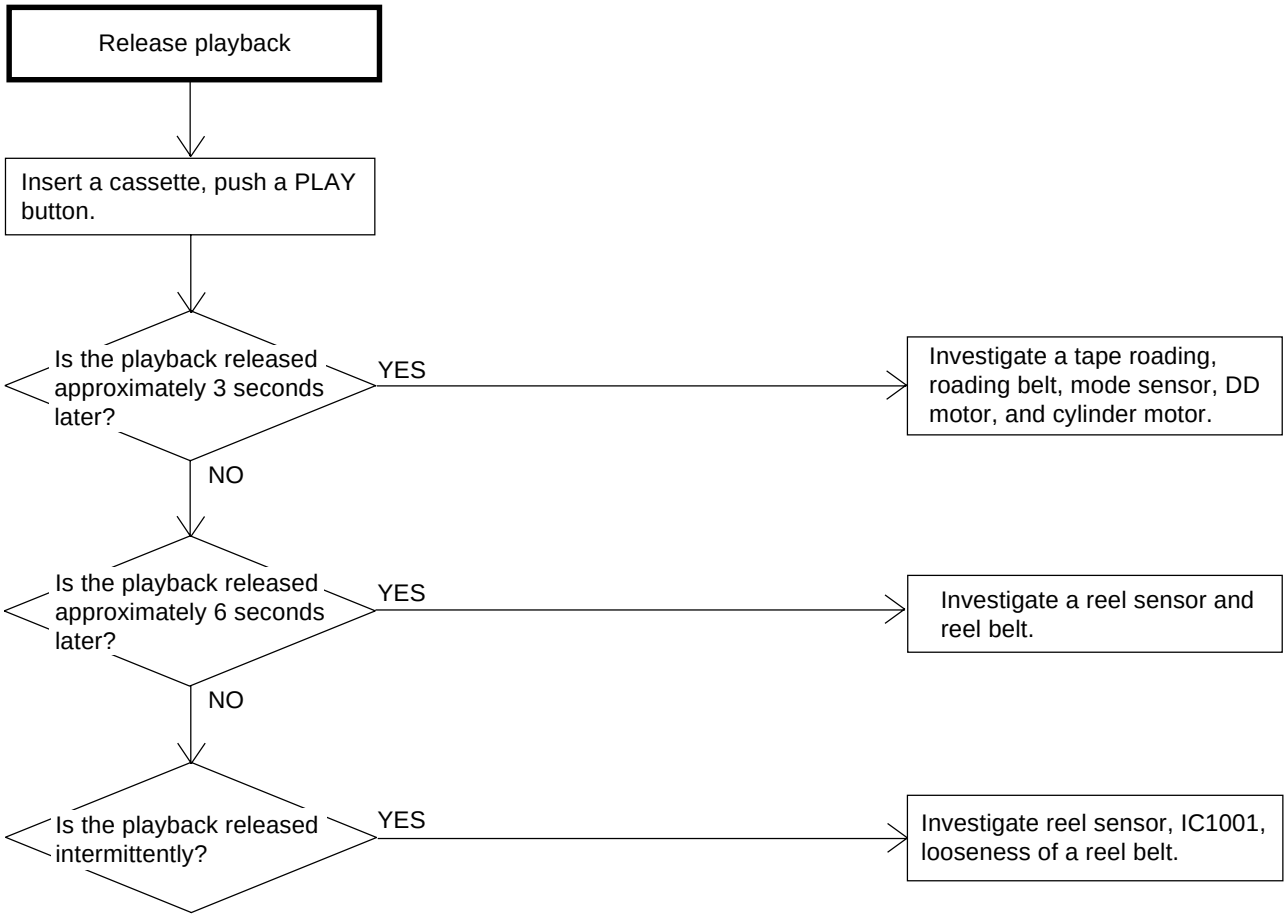

No sound.
The voltage of CD355 and CD356 do change with the volume key?
NO
Investigate speaker and headphonejack.
YES
The 1st pin of IC352 does it exist DC7.1V?
NO
Investigate D505 and D534 and the peripheral circuit.
YES
The 2nd pin of IC352 does it exist DC3.5V?
NO
Investigate IC352 and the peripheral circuit.
YES
Investigate 2nd,19th pin of IC301 and the peripheral circuit.
No picture.
Are the adjustment of the brightness and contrast standard?
NO
Adjust the brightness and contrast.
YES
The 55th pin of IC601 does it exist DC9V?
NO
Investigate AT13V line.
YES
Is the signal output from the 14th,15th,16th pin of IC601?
NO
Is the waveform of the 36th pin of IC601 normal?
NO
Investigate the X602 and the peripheral circuit.
YES
YES
Exchange the IC601.
Investigate IC601 and the peripheral circuit.

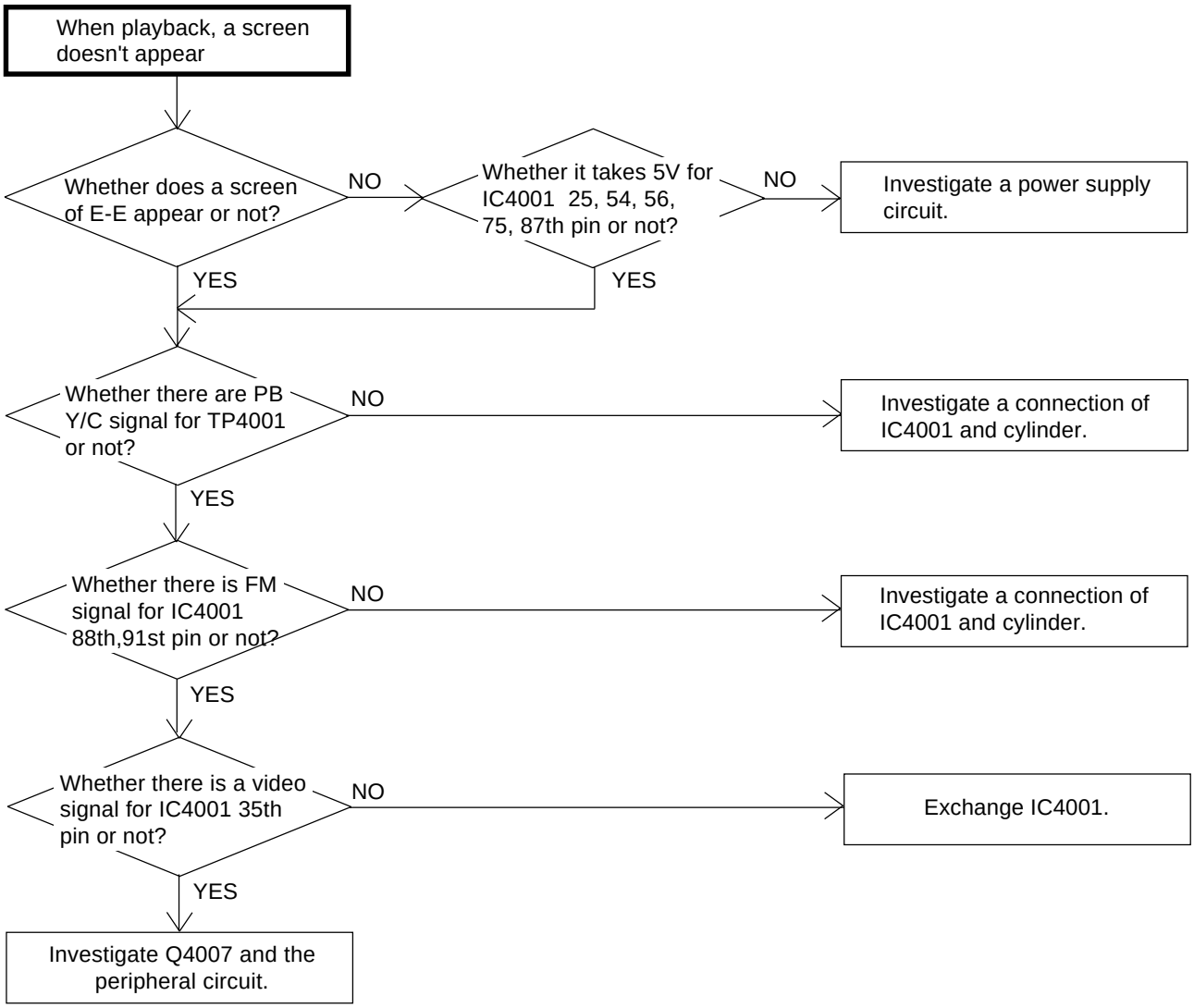

A color doesn't adhere to it
Are the adjustment of the color standard?
NO
Color is adjust.
YES
Is it receive the sgnal of the color?
NO
Receive signal of the color.
YES
Is the waveform of the 36th pin of IC601 normal?
NO
Investigate the X602 and the peripheral circuit.
YES
Investigate the IC601 and the peripheral circuit.

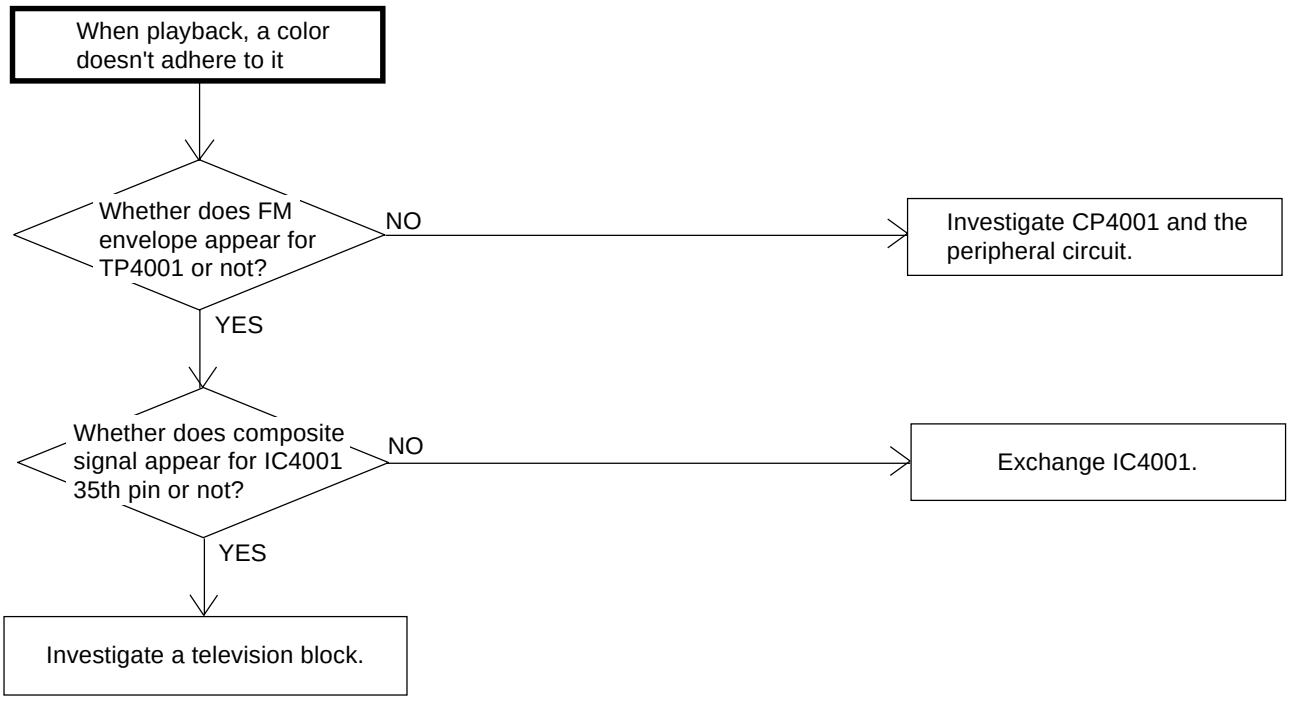

An only horizontal line appears
Is the waveform of the 1st pin of IC401 normal?
NO
Investigate the IC601 and the peripheral circuit.
YES
The 6th pin of IC401 does it exist DC25V?
NO
Investigate D411,R452 and a peripheral circuit.
YES
Investigate IC401,CP401 and the peripheral circuit.

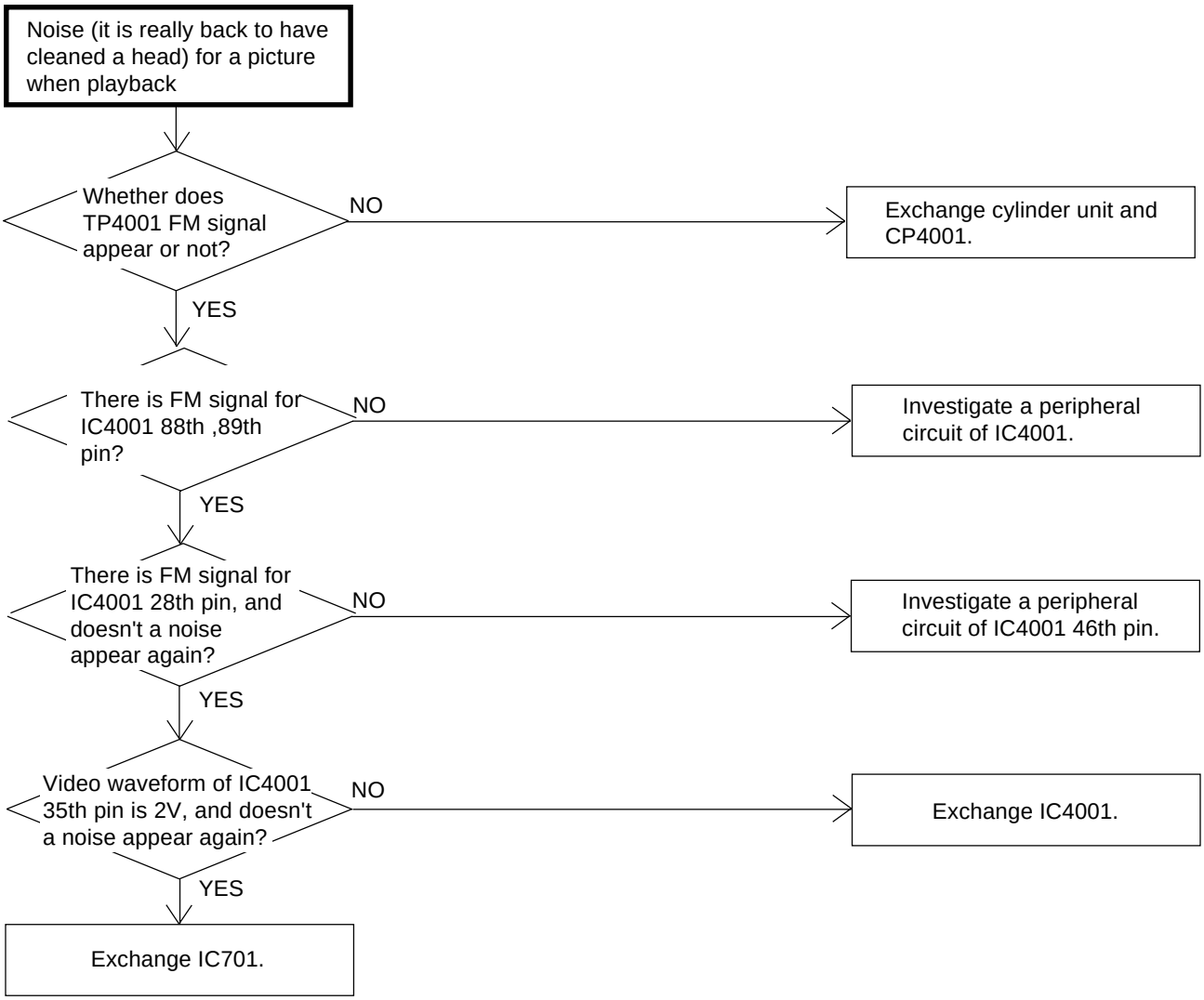

Screen display doesn't appear
The wave form of the 62nd pin, the 63rd pin, the 64th pin of IC1001 normal?
NO
Investigate IC1001 and the peripheral circuit.
YES
The wave form of the 14th pin, 15th pin and 16th pin of IC601 normal?
NO
Investigate the circuit of IC601 from IC1001.
YES
Investigate IC601 and the peripheral circuit.

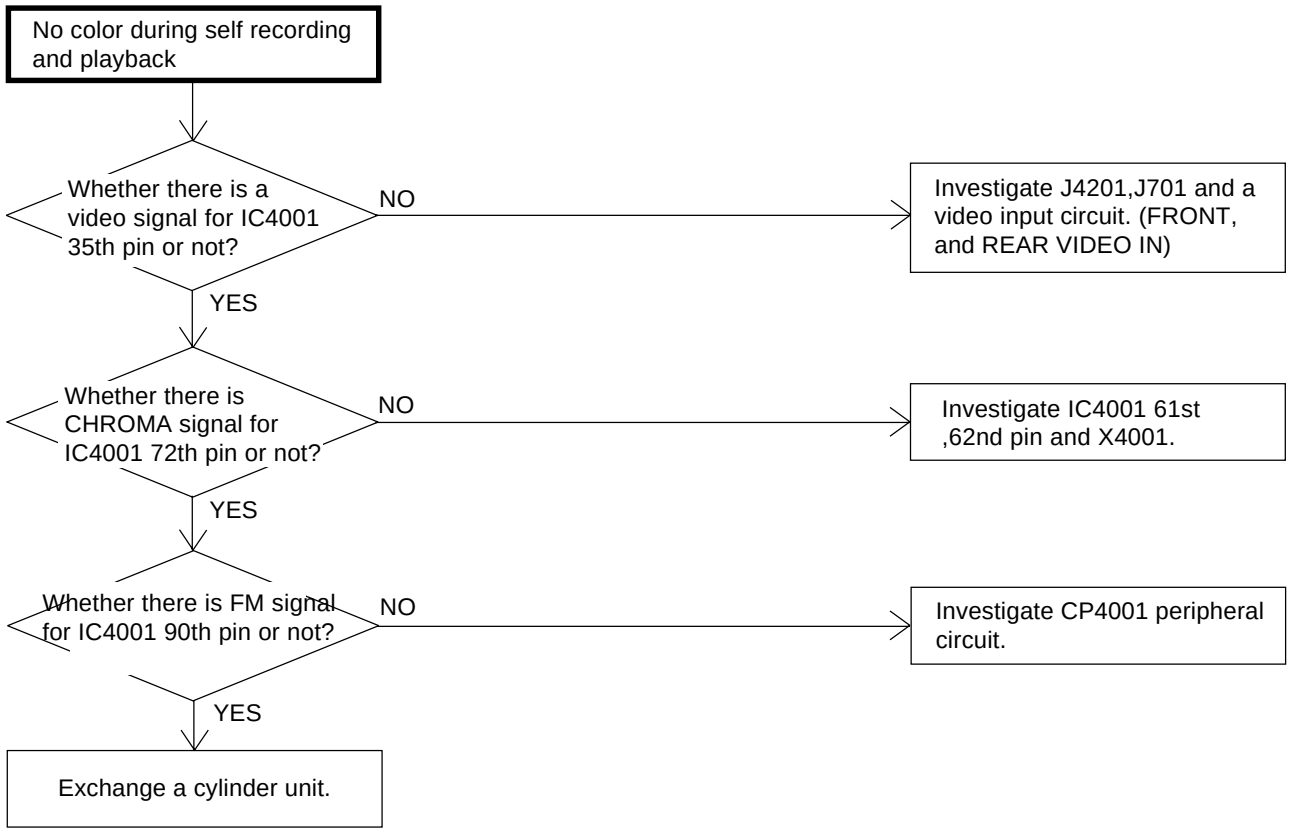
(Video division)

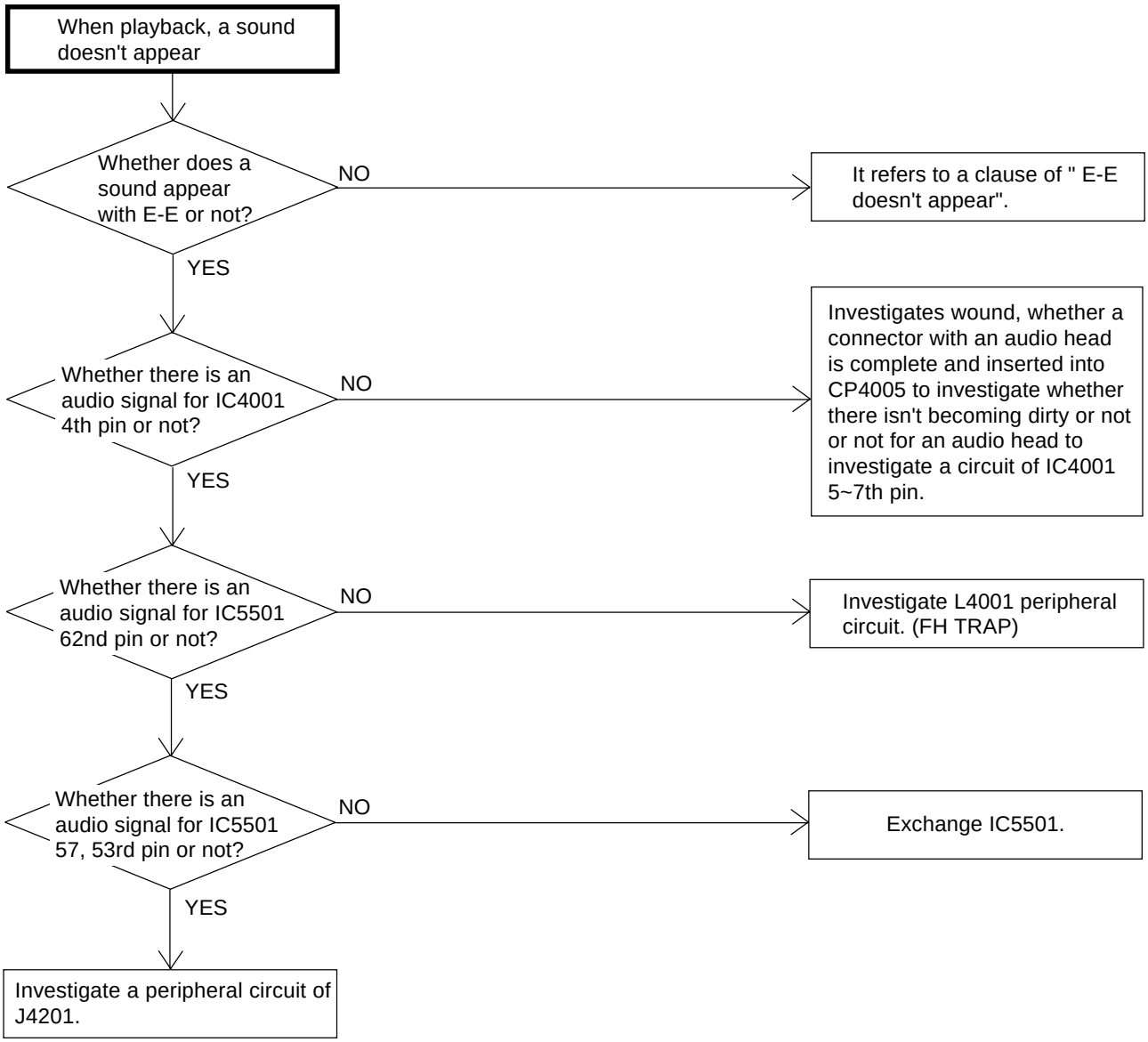

Release playback
Insert a cassette, push a PLAY button.
Is the playback released approximately 3 seconds later?
YES
Investigate a tape roading, roading belt, mode sensor, DD motor, and cylinder motor.
NO
Is the playback released approximately 6 seconds later?
YES
Investigate a reel sensor and reel belt.
NO
Is the playback released intermittently?
YES
Investigate reel sensor, IC1001, looseness of a reel belt.

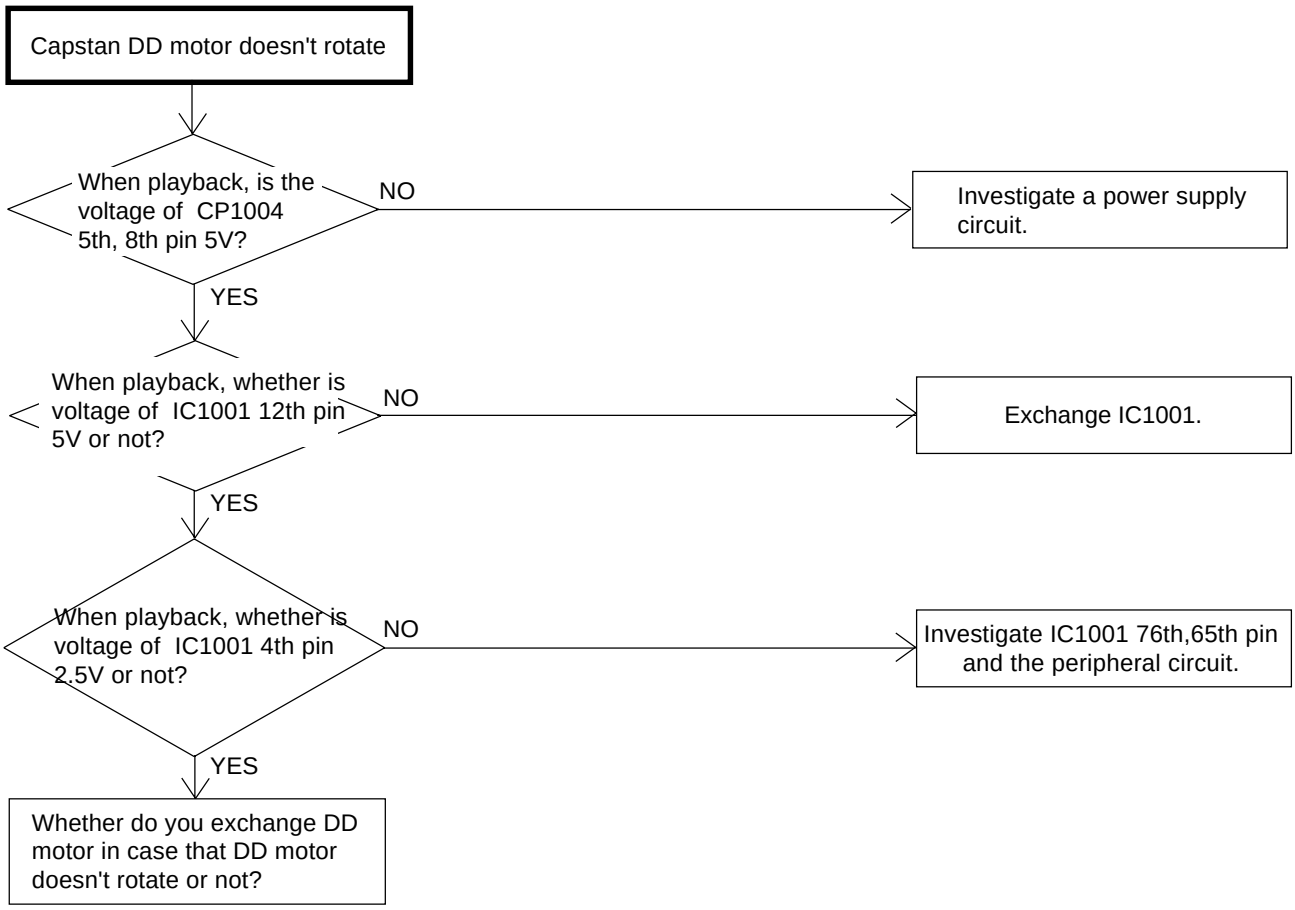

When playback, a screen doesn't appear
Whether does a screen of E-E appear or not?
NO
Whether it takes 5V for IC4001 25, 54, 56, 75, 87th pin or not?
NO
Investigate a power supply circuit.
YES
YES
Whether there are PB Y/C signal for TP4001 or not?
NO
Investigate a connection of IC4001 and cylinder.
YES
Whether there is FM signal for IC4001 88th,91st pin or not?
NO
Investigate a connection of IC4001 and cylinder.
YES
Whether there is a video signal for IC4001 35th pin or not?
NO
Exchange IC4001.
YES
Investigate Q4007 and the peripheral circuit.

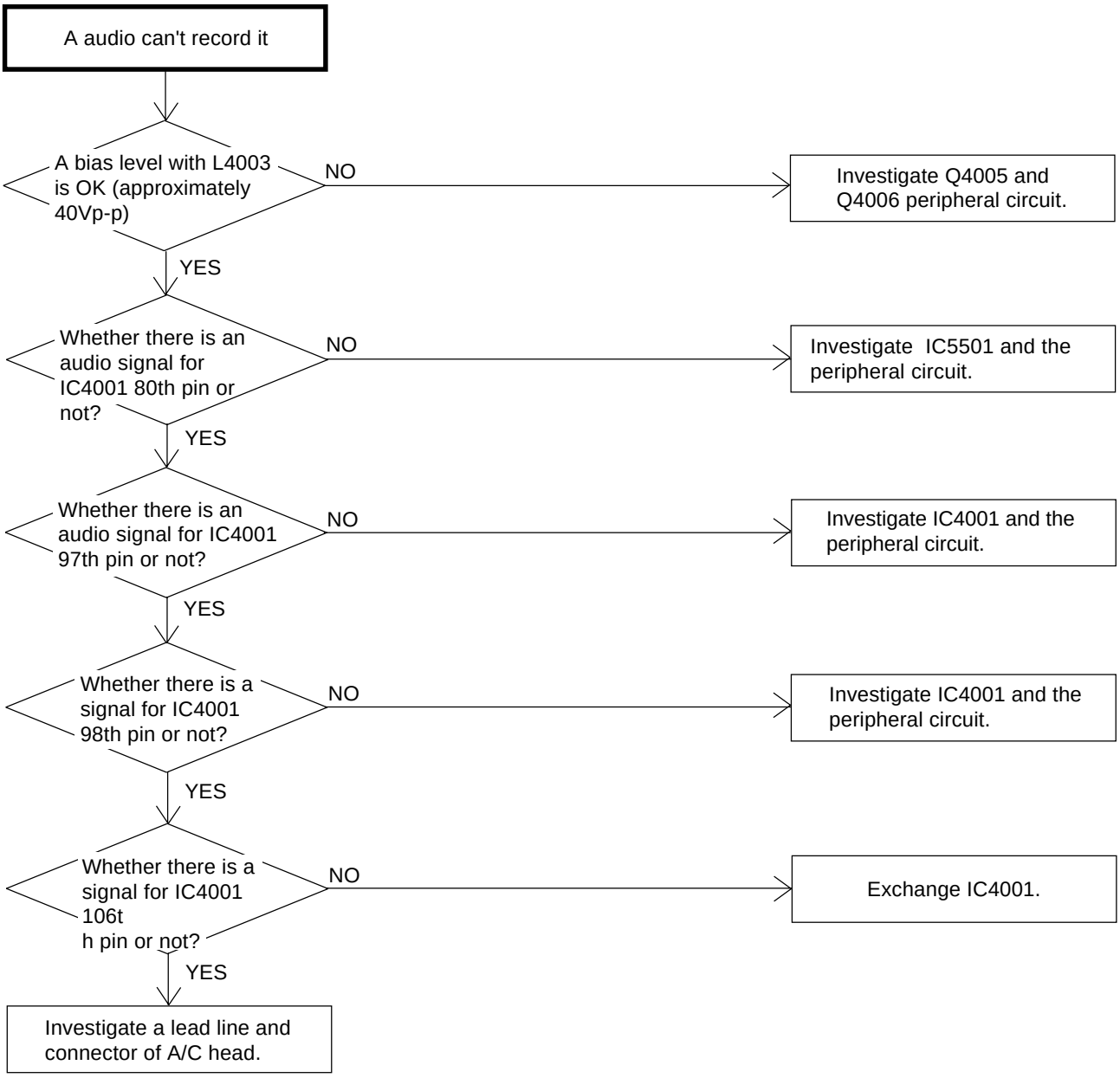

When playback, a color doesn't adhere to it
Whether does FM envelope appear for TP4001 or not?
NO
Investigate CP4001 and the peripheral circuit.
YES
Whether does composite signal appear for IC4001 35th pin or not?
NO
Exchange IC4001.
YES
Investigate a television block.

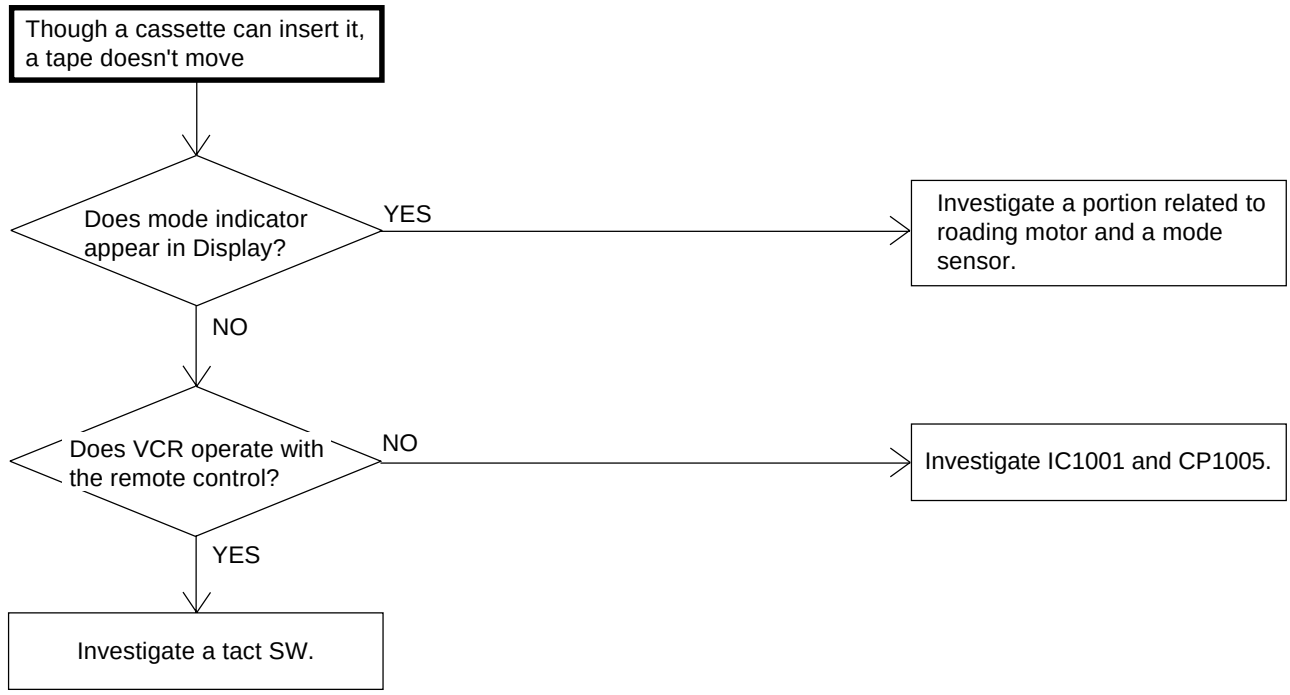

Noise (it is really back to have cleaned a head) for a picture when playback
Whether does TP4001 FM signal appear or not?
NO
Exchange cylinder unit and CP4001.
YES
There is FM signal for IC4001 88th ,89th pin?
NO
Investigate a peripheral circuit of IC4001.
YES
There is FM signal for IC4001 28th pin, and doesn't a noise appear again?
NO
Investigate a peripheral circuit of IC4001 46th pin.
YES
Video waveform of IC4001 35th pin is 2V, and doesn't a noise appear again?
NO
Exchange IC4001.
YES
Exchange IC701.

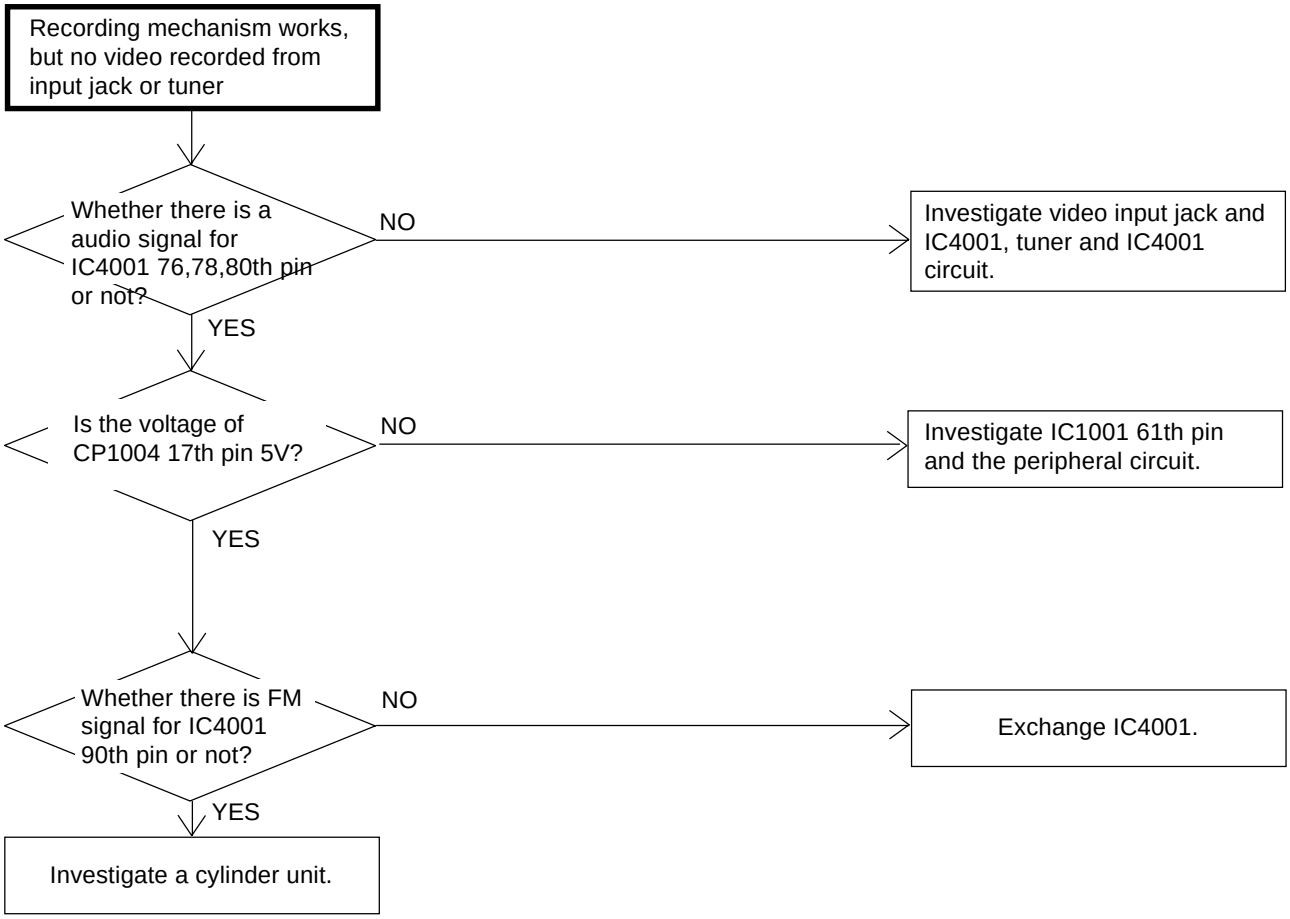

No color during self recording and playback
Whether there is a video signal for IC4001 35th pin or not?
NO
Investigate J4201,J701 and a video input circuit. (FRONT, and REAR VIDEO IN)
YES
Whether there is CHROMA signal for IC4001 72th pin or not?
NO
Investigate IC4001 61st ,62nd pin and X4001.
YES
Whether there is FM signal for IC4001 90th pin or not?
NO
Investigate CP4001 peripheral circuit.
YES
Exchange a cylinder unit.

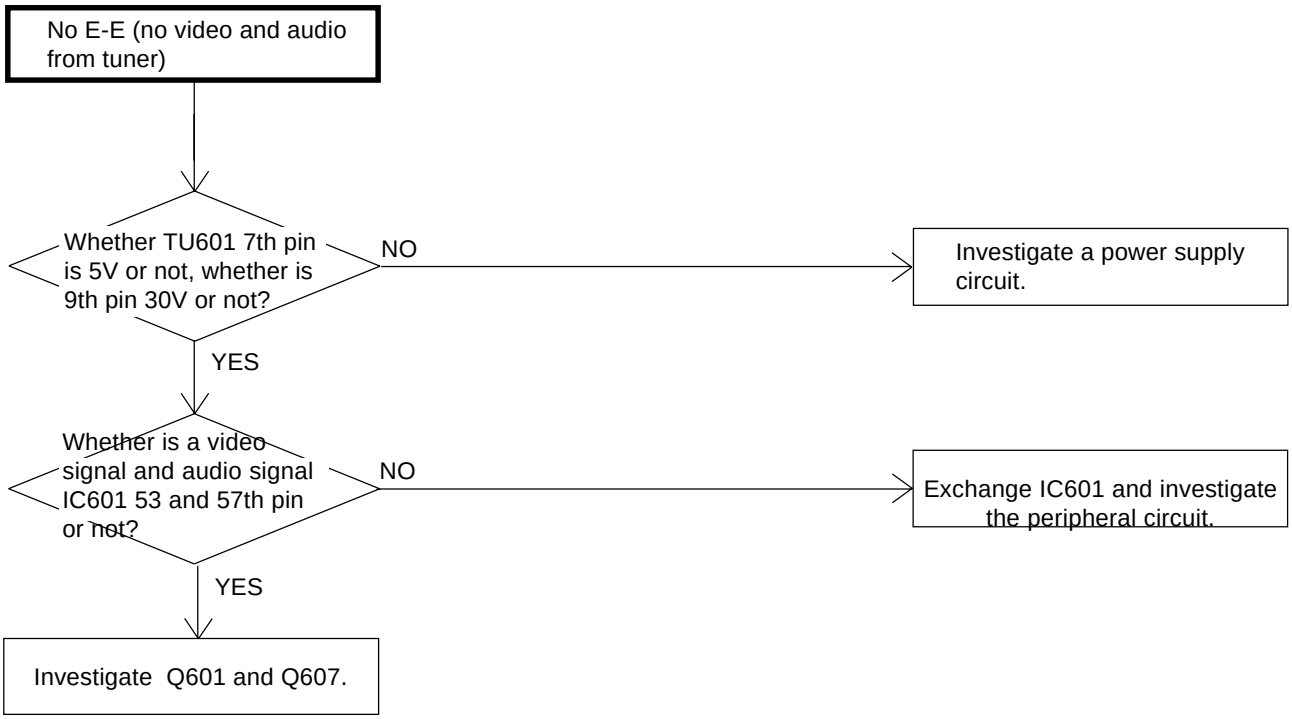

When playback, a sound doesn't appear
Whether does a sound appear with E-E or not?
NO
It refers to a clause of " E-E doesn't appear".
YES
Whether there is an audio signal for IC4001 4th pin or not?
NO
Investigates wound, whether a connector with an audio head is complete and inserted into CP4005 to investigate whether there isn't becoming dirty or not or not for an audio head to investigate a circuit of IC4001 5~7th pin.
YES
Whether there is an audio signal for IC5501 62nd pin or not?
NO
Investigate L4001 peripheral circuit. (FH TRAP)
YES
Whether there is an audio signal for IC5501 57, 53rd pin or not?
NO
Exchange IC5501.
YES
Investigate a peripheral circuit of J4201.

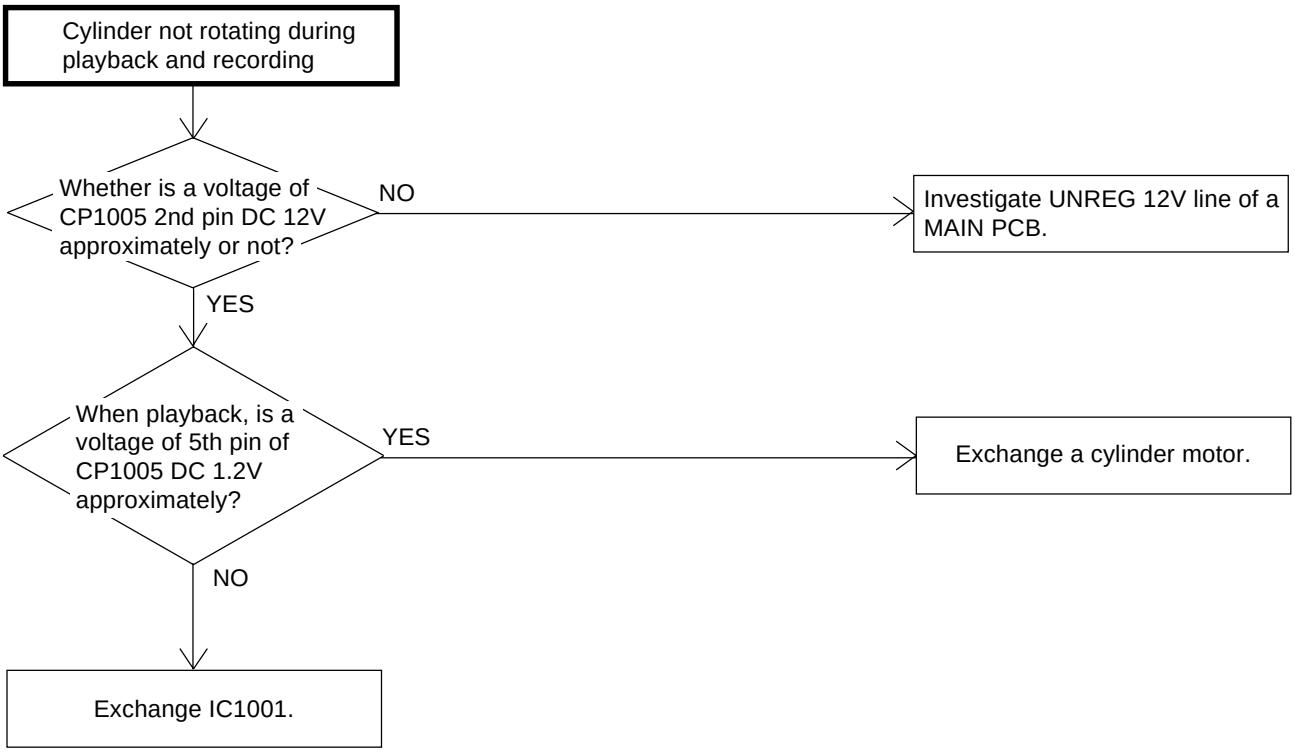

Capstan DD motor doesn't rotate
When playback, is the voltage of CP1004 5th, 8th pin 5V?
NO
Investigate a power supply circuit.
YES
When playback, whether is voltage of IC1001 12th pin 5V or not?
NO
Exchange IC1001.
YES
When playback, whether is voltage of IC1001 4th pin 2.5V or not?
NO
Investigate IC1001 76th,65th pin and the peripheral circuit.
YES
Whether do you exchange DD motor in case that DD motor doesn't rotate or not?

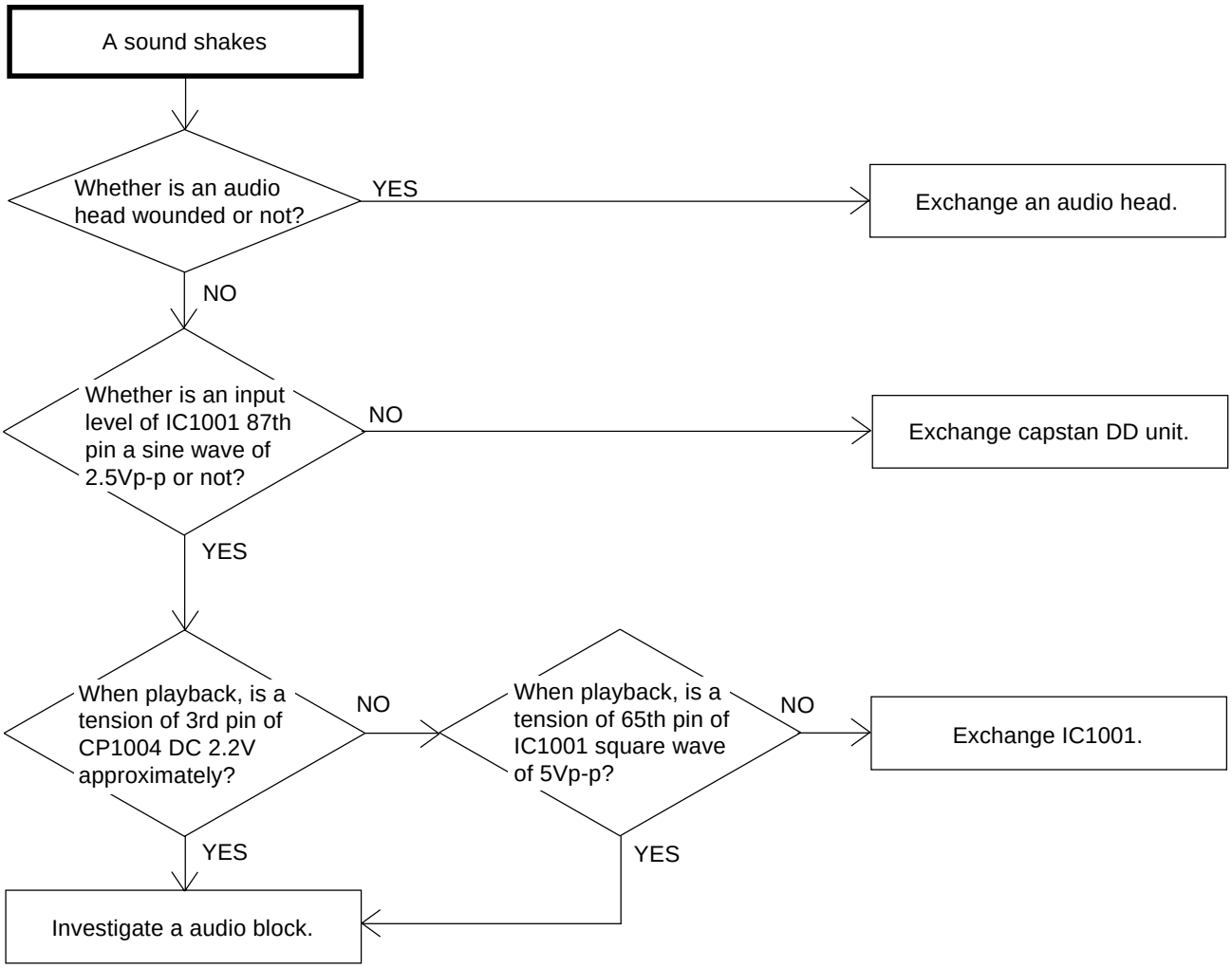

A audio can't record it
A bias level with L4003 is OK (approximately 40Vp-p)
NO
Investigate Q4005 and Q4006 peripheral circuit.
YES
Whether there is an audio signal for IC4001 80th pin or not?
NO
Investigate IC5501 and the peripheral circuit.
YES
Whether there is an audio signal for IC4001 97th pin or not?
NO
Investigate IC4001 and the peripheral circuit.
YES
Whether there is a signal for IC4001 98th pin or not?
NO
Investigate IC4001 and the peripheral circuit.
YES
Whether there is a signal for IC4001 106t h pin or not?
NO
Exchange IC4001.
YES
Investigate a lead line and connector of A/C head.

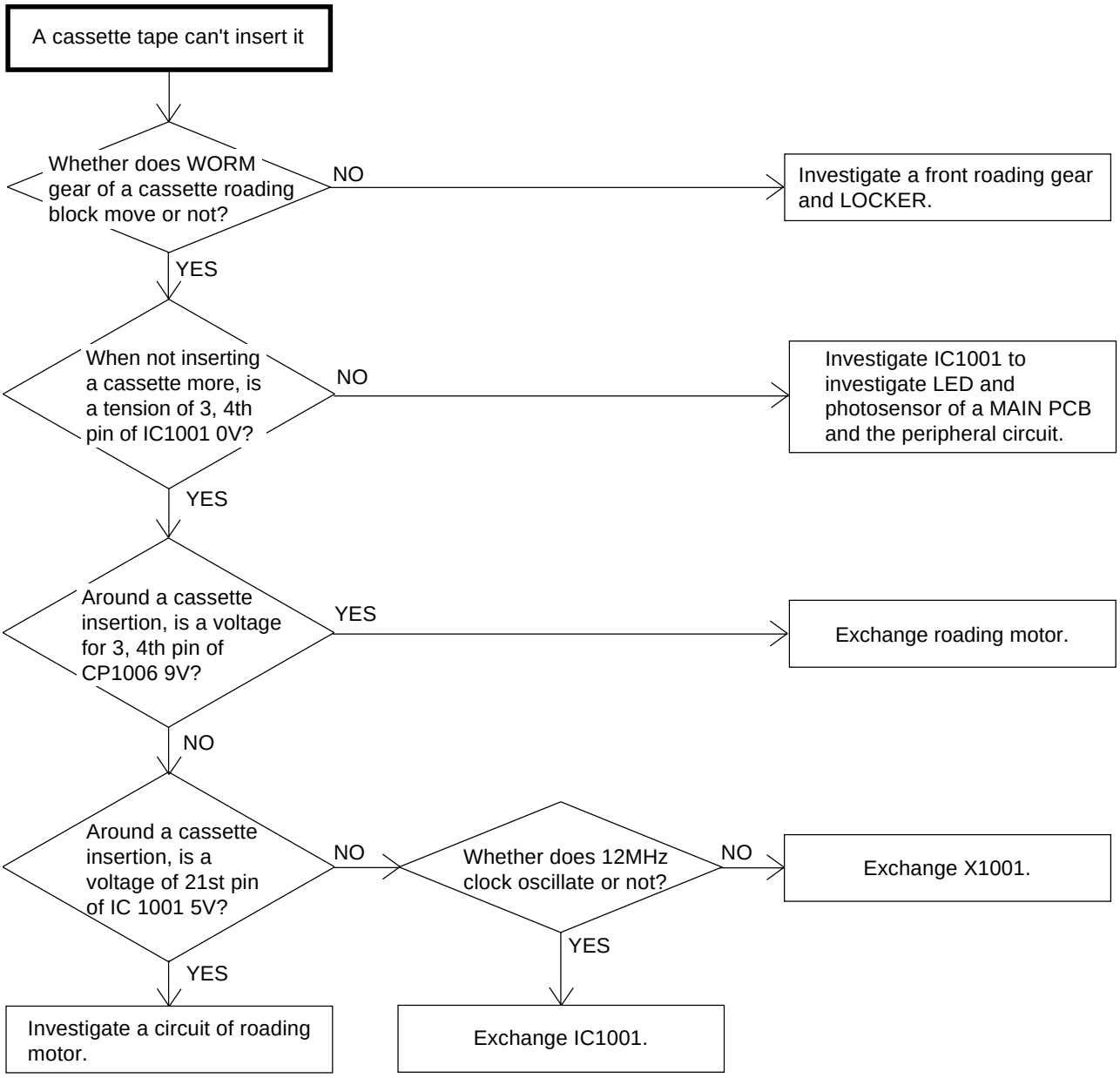

Though a cassette can insert it, a tape doesn't move
Does mode indicator appear in Display?
YES
Investigate a portion related to roading motor and a mode sensor.
NO
Does VCR operate with the remote control?
NO
Investigate IC1001 and CP1005.
YES
Investigate a tact SW.

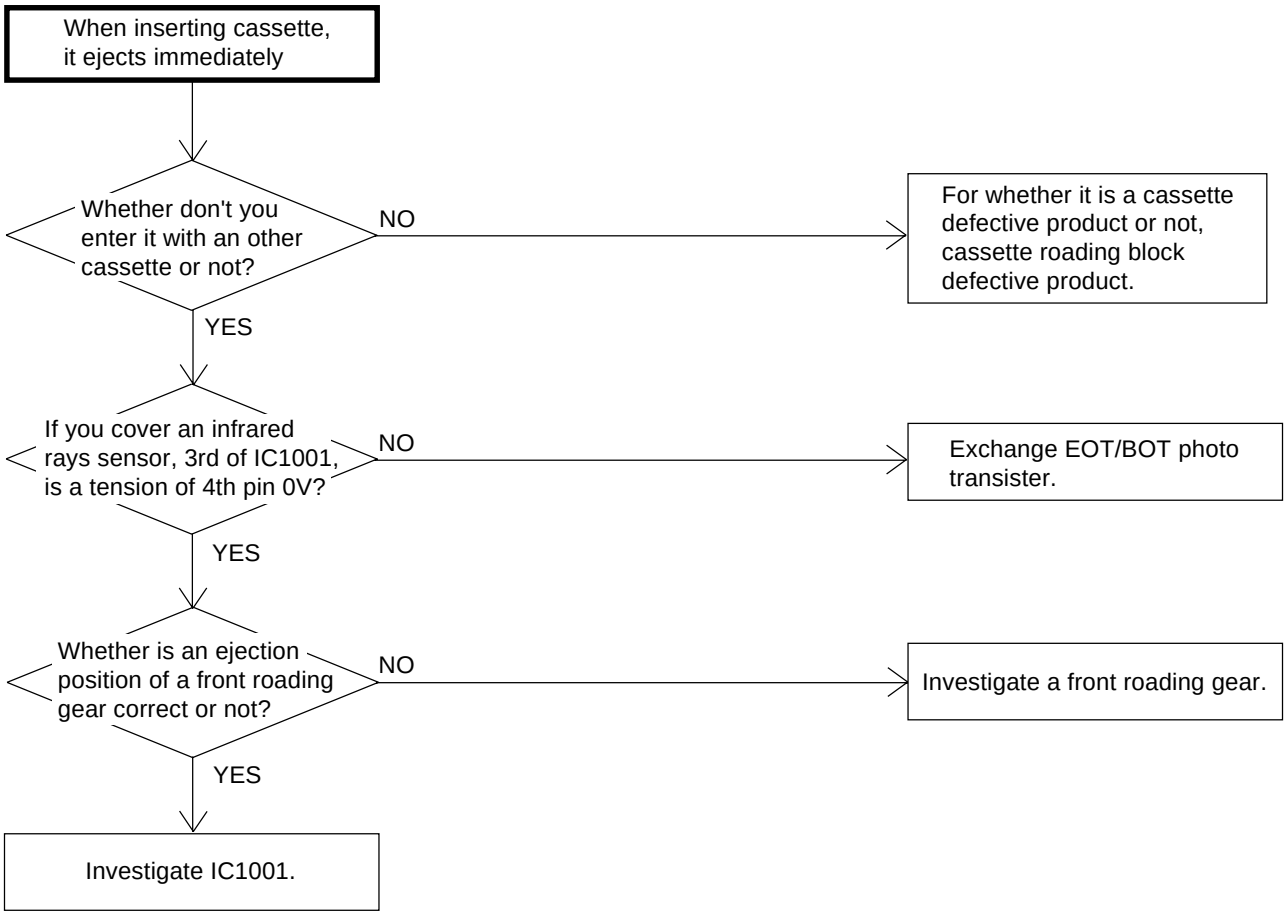

Recording mechanism works, but no video recorded from input jack or tuner
Whether there is a audio signal for IC4001 76,78,80th pin or not?
NO
Investigate video input jack and IC4001, tuner and IC4001 circuit.
YES
Is the voltage of CP1004 17th pin 5V?
NO
Investigate IC1001 61th pin and the peripheral circuit.
YES
Whether there is FM signal for IC4001 90th pin or not?
NO
Exchange IC4001.
YES
Investigate a cylinder unit.

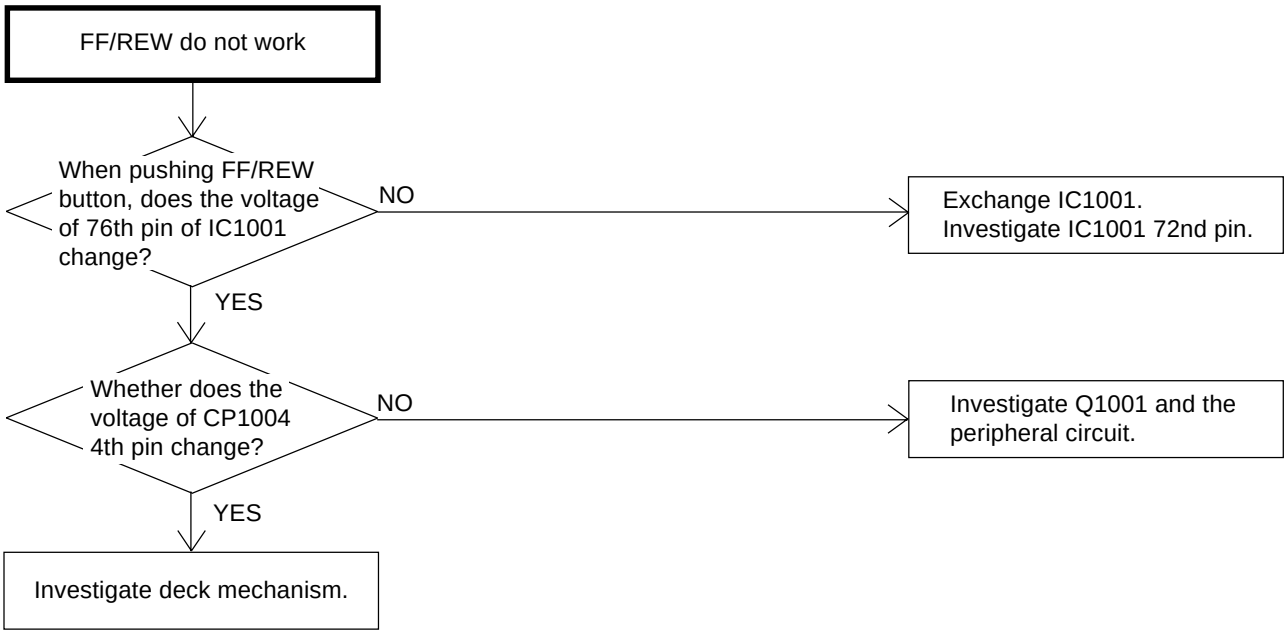

No E-E (no video and audio from tuner)
Whether TU601 7th pin is 5V or not, whether is 9th pin 30V or not?
NO
Investigate a power supply circuit.
YES
Whether is a video signal and audio signal IC601 53 and 57th pin or not?
NO
Exchange IC601 and investigate the peripheral circuit.
YES
Investigate Q601 and Q607.

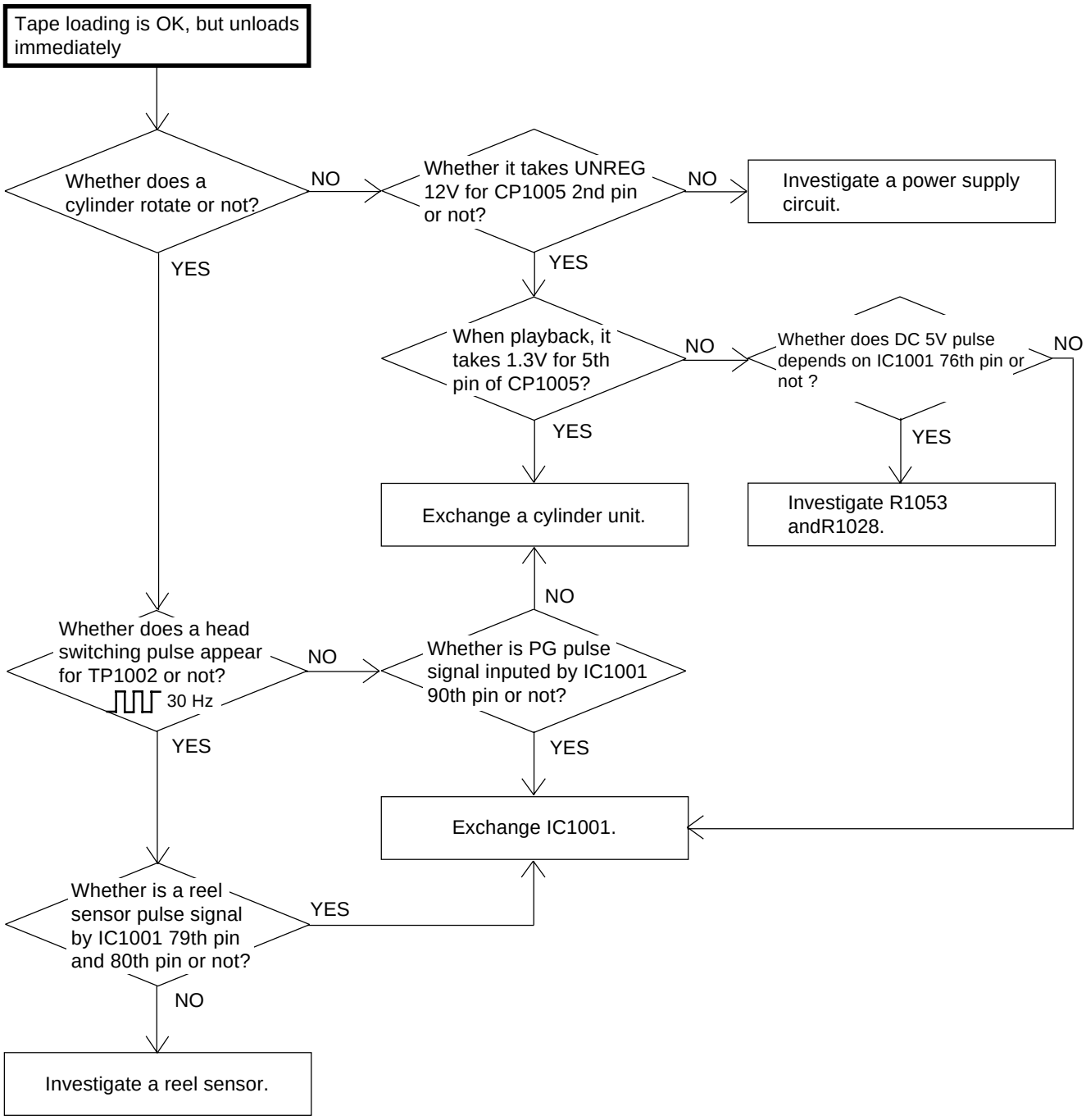

Cylinder not rotating during playback and recording
Whether is a voltage of CP1005 2nd pin DC 12V approximately or not?
NO
Investigate UNREG 12V line of a MAIN PCB.
YES
When playback, is a voltage of 5th pin of CP1005 DC 1.2V approximately?
YES
Exchange a cylinder motor.
NO
Exchange IC1001.

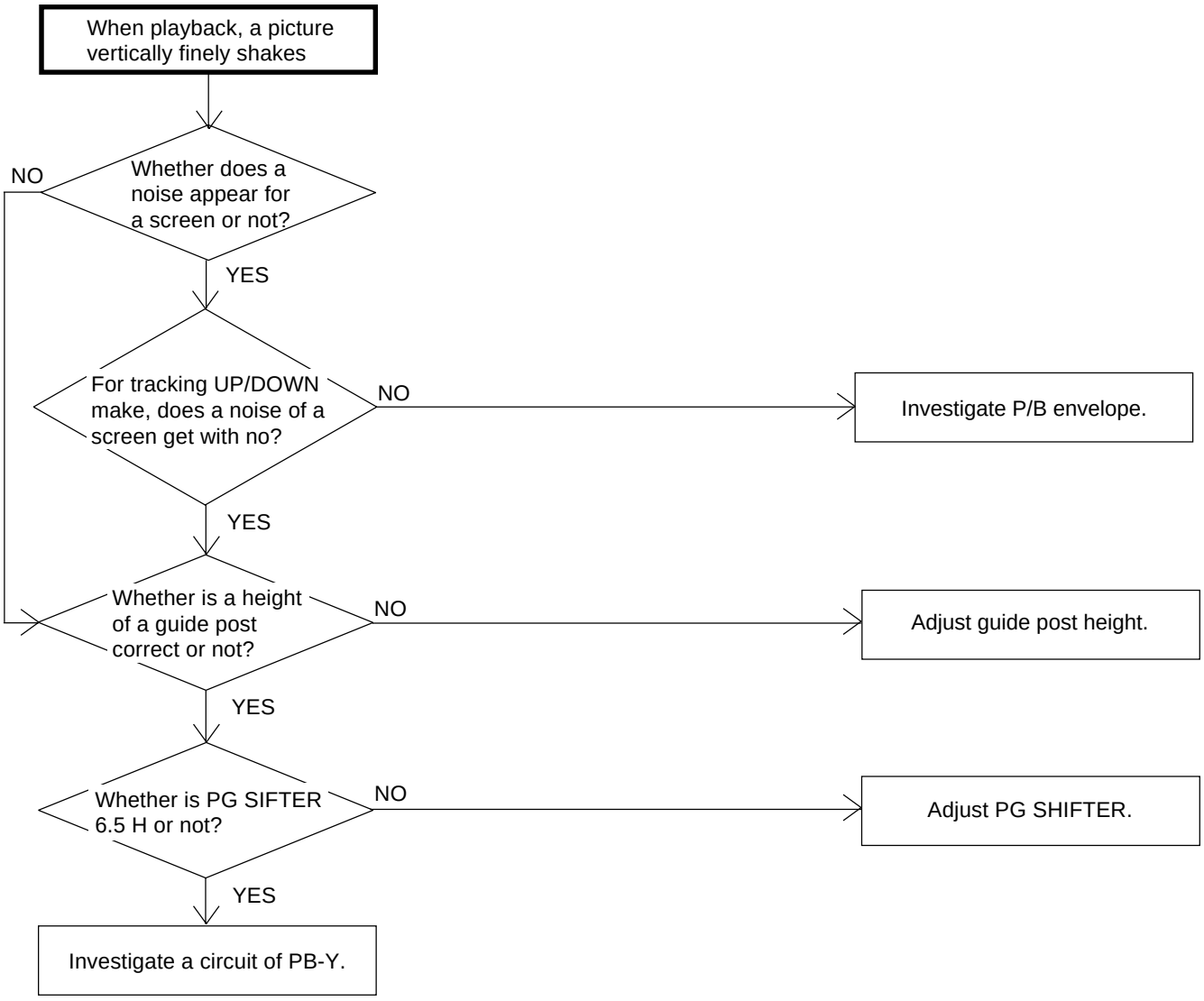

A sound shakes
Whether is an audio head wounded or not?
YES
Exchange an audio head.
NO
Whether is an input level of IC1001 87th pin a sine wave of 2.5Vp-p or not?
NO
Exchange capstan DD unit.
YES
When playback, is a tension of 3rd pin of CP1004 DC 2.2V approximately?
NO
When playback, is a tension of 65th pin of IC1001 square wave of 5Vp-p?
NO
Exchange IC1001.
YES
YES
Investigate a audio block.

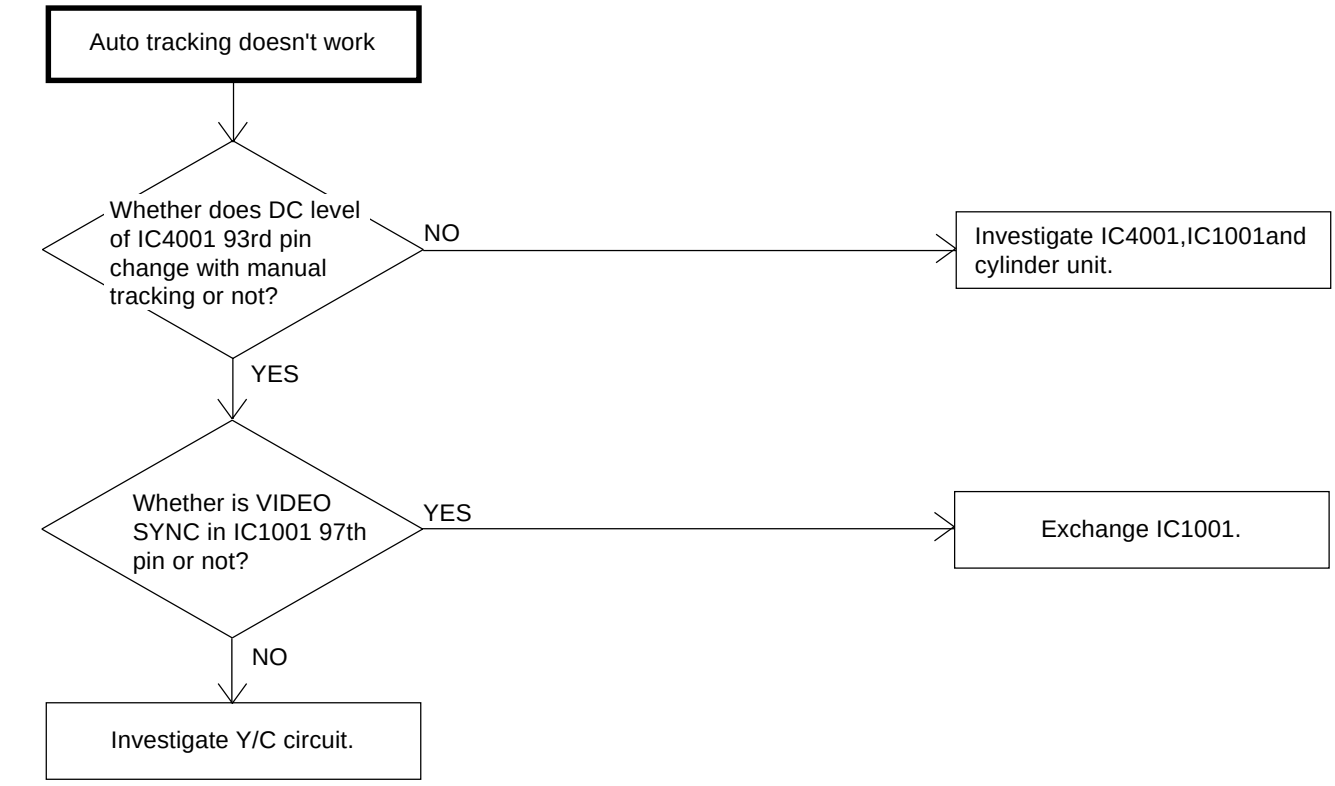

A cassette tape can't insert it
Whether does WORM gear of a cassette roading block move or not?
NO
Investigate a front roading gear and LOCKER.
YES
When not inserting a cassette more, is a tension of 3, 4th pin of IC1001 0V?
NO
Investigate IC1001 to investigate LED and photosensor of a MAIN PCB and the peripheral circuit.
YES
Around a cassette insertion, is a voltage for 3, 4th pin of CP1006 9V?
YES
Exchange roading motor.
NO
Around a cassette insertion, is a voltage of 21st pin of IC 1001 5V?
NO
Whether does 12MHz clock oscillate or not?
NO
Exchange X1001.
YES
YES
Investigate a circuit of roading motor.
Exchange IC1001.

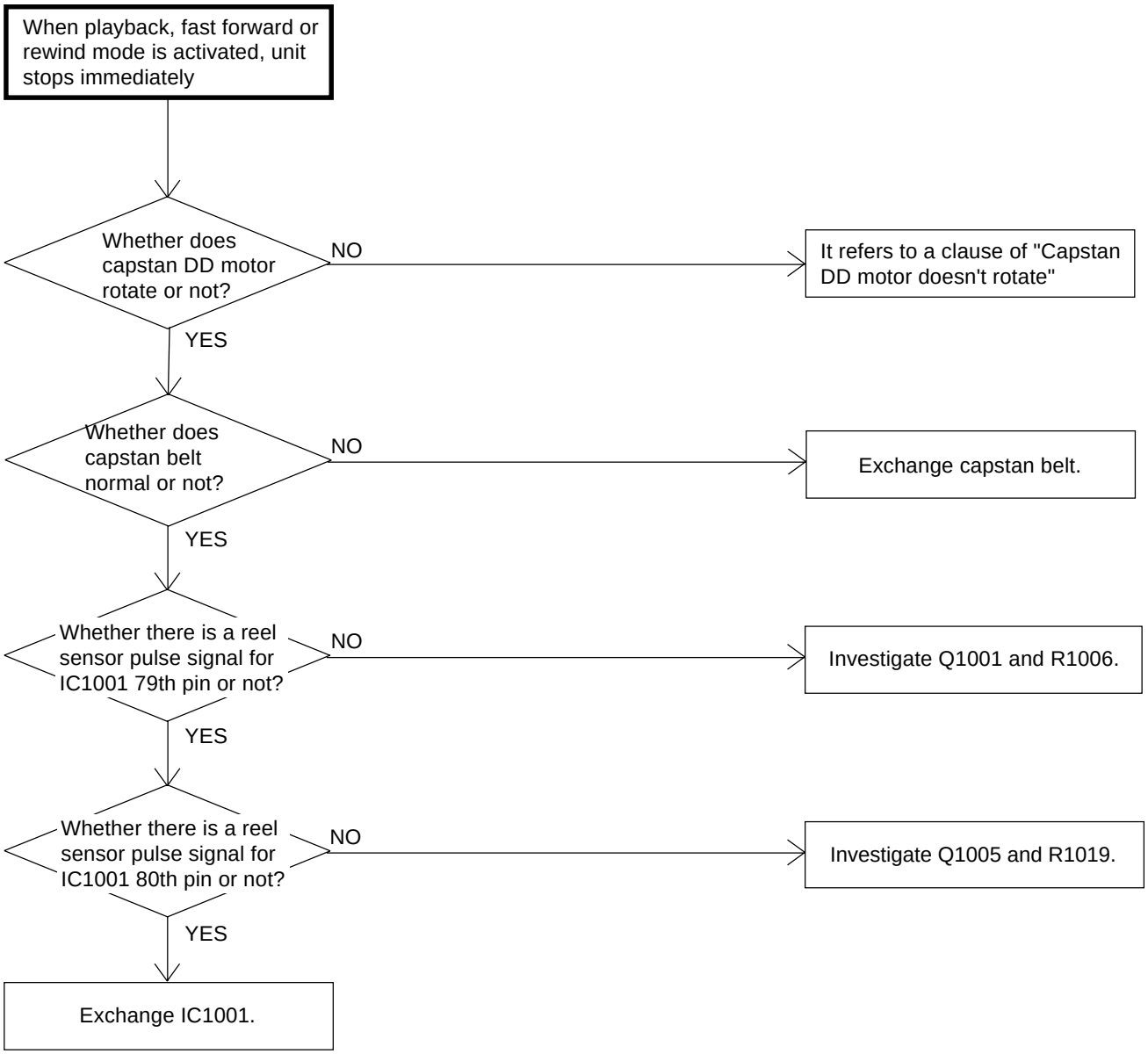

When inserting cassette, it ejects immediately
Whether don't you enter it with an other cassette or not?
NO
For whether it is a cassette defective product or not, cassette roading block defective product.
YES
If you cover an infrared rays sensor, 3rd of IC1001, is a tension of 4th pin 0V?
NO
Exchange EOT/BOT photo transister.
YES
Whether is an ejection position of a front roading gear correct or not?
NO
Investigate a front roading gear.
YES
Investigate IC1001.

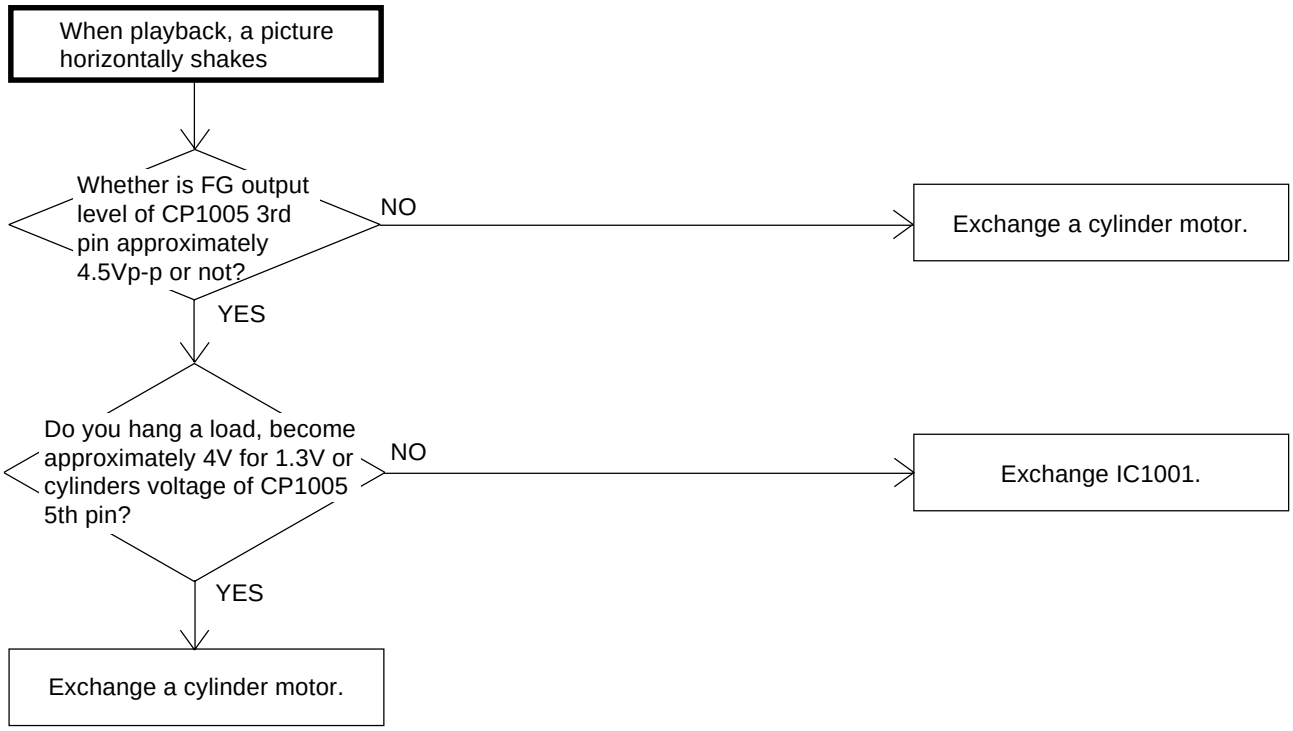

FF/REW do not work
When pushing FF/REW button, does the voltage of 76th pin of IC1001 change?
NO
Exchange IC1001. Investigate IC1001 72nd pin.
YES
Whether does the voltage of CP1004 4th pin change?
NO
Investigate Q1001 and the peripheral circuit.
YES
Investigate deck mechanism.

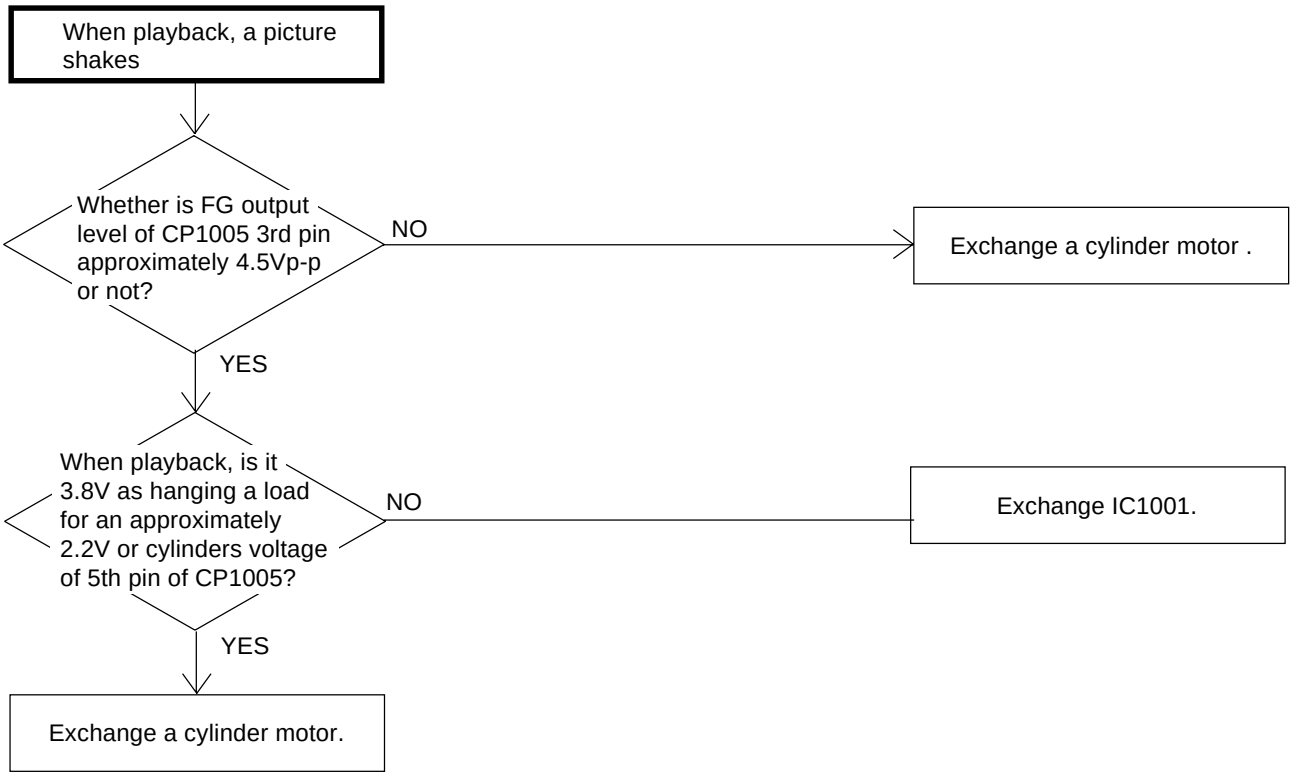

Tape loading is OK, but unloads immediately
Whether does a cylinder rotate or not?
NO
Whether it takes UNREG 12V for CP1005 2nd pin or not?
NO
Investigate a power supply circuit.
YES
YES
When playback, it takes 1.3V for 5th pin of CP1005?
NO
Whether does DC 5V pulse depends on IC1001 76th pin or not ?
NO
YES
YES
Exchange a cylinder unit.
Investigate R1053 andR1028.
NO
Whether does a head switching pulse appear for TP1002 or not?
30 Hz
NO
Whether is PG pulse signal inputed by IC1001 90th pin or not?
YES
YES
Exchange IC1001.
Whether is a reel sensor pulse signal by IC1001 79th pin and 80th pin or not?
YES
NO
Investigate a reel sensor.


When playback, a picture vertically finely shakes
Whether does a noise appear for a screen or not?
NO
YES
For tracking UP/DOWN make, does a noise of a screen get with no?
NO
Investigate P/B envelope.
YES
Whether is a height of a guide post correct or not?
NO
Adjust guide post height.
YES
Whether is PG SIFTER 6.5 H or not?
NO
Adjust PG SHIFTER.
YES
Investigate a circuit of PB-Y.


Auto tracking doesn't work
Whether does DC level of IC4001 93rd pin change with manual tracking or not?
NO
Investigate IC4001,IC1001and cylinder unit.
YES
Whether is VIDEO SYNC in IC1001 97th pin or not?
YES
Exchange IC1001.
NO
Investigate Y/C circuit.


When playback, fast forward or rewind mode is activated, unit stops immediately
Whether does capstan DD motor rotate or not?
NO
It refers to a clause of "Capstan DD motor doesn't rotate"
YES
Whether does capstan belt normal or not?
NO
Exchange capstan belt.
YES
Whether there is a reel sensor pulse signal for IC1001 79th pin or not?
NO
Investigate Q1001 and R1006.
YES
Whether there is a reel sensor pulse signal for IC1001 80th pin or not?
NO
Investigate Q1005 and R1019.
YES
Exchange IC1001.


When playback, a picture horizontally shakes
Whether is FG output level of CP1005 3rd pin approximately 4.5Vp-p or not?
NO
Exchange a cylinder motor.
YES
Do you hang a load, become approximately 4V for 1.3V or cylinders voltage of CP1005 5th pin?
NO
Exchange IC1001.
YES
Exchange a cylinder motor.


When playback, a picture shakes
Whether is FG output level of CP1005 3rd pin approximately 4.5Vp-p or not?
NO
Exchange a cylinder motor .
YES
When playback, is it 3.8V as hanging a load for an approximately 2.2V or cylinders voltage of 5th pin of CP1005?
NO
Exchange IC1001.
YES
Exchange a cylinder motor.

TV-20F242

TV-20F242 STANDARD CIRCUIT DIAGRAM

■ NOTE ON USING CIRCUIT DIAGRAMS

1.SAFETY

The Components identified by the symbol ⚠ are critical for safety. For continued safety, replace safety critical components only with manufacturer's recommended parts.

2.INDICATION OF PARTS SYMBOL [EXAMPLE]

●In the PC board :R1209→R209

3.NOTE FOR REPAIRING SERVICE

This model's power circuit is partly different in the GND.
Please, care must be taken for the following points.
(1)Do not touch the LIVE side GND or the LIVE side GND and the ISOLATED(NEUTRAL) side GND simultaneously. If the above caution is not respected, an electric shock may be caused. Therefore, make sure that the power cord is surely removed from the receptacle when, for example, the chassis is pulled out.
(2)Do not short between the LIVE side GND and ISOLATED(NEUTRAL) side GND or never measure with a measuring apparatus (oscilloscope, etc.) the LIVE side GND and ISOLATED(NEUTRAL) side GND at the same time. If the above precaution is not respected , a fuse or any parts will be broken.
◇Since the circuit diagram is a standard one, the circuit and circuit constants may be subject to change for improvement without any notice.

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SYSCON PCB Y/C/AUDIO/HEAD AMP SCHEMATIC DIAGRAM
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SYSCON PCB SOUND AMP SCHEMATIC DIAGRAM
SYSCON PCB HIFI SCHEMATIC DIAGRAM
SYSCON PCB POWER SCHEMATIC DIAGRAM
MAIN PCB TV POWER SCHEMATIC DIAGRAM
MAIN PCB DEFLECTION SCHEMATIC DIAGRAM
DIGITAL COMB FILTER PCB SCHEMATIC DIAGR
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MAIN/CRT PCB PATTERN
SYSCON PCB PATTERN
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TV-20F242

SEMICONDUCTOR BASE CONNECTIONS

DIODE

1SS133T-77
HZ11B3L TD
HZ27-1L TD
MTZJ13B T-77
MTZJ30B T-77
MTZJ33B T-77
MTZJ5.1B T-77
MTZJ5.6B T-77
MTZJ6.8B T-77
MTZJ8.2C T-77
SB10-03A3

11E1-EIC
11EQS04N-TA1B2
11ES1N-TA1B2
RD12FB-T7

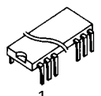
10ELS2N-TA1B2
21DQ09N-FC4
21DQ09N-TA2B1
RMPG06J-G3
RU2AM V1

SID1050CM
SLR-342MCT32
SLR-342VCT32

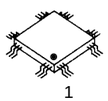
FMV-3FULF027-102

GBL06L-6177

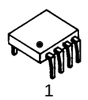
IC



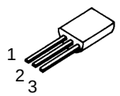
M62420SP



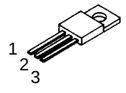
AN3662FBP
M61203CFP
OEC7043C



S-24C04BDP-LA

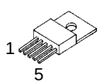


PST600H



KIA7805API
KIA7809API
KIA7809PI

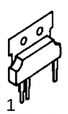
BA6955N



STR-G6624

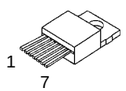
TLP621(GR)

LA71067SM-MPB



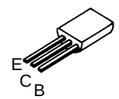
AN7522

TC90A45F

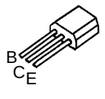


LA78040

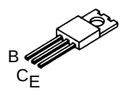
TRANSISTOR



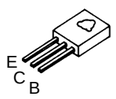
2SA1015Y(TPE2)
2SA1318(S,T)-AA
2SA1371(D,E)-AE
2SA1624-AA
2SB892(S,T)-AE
2SC13840W
2SC1815Y(TPE2)
2SC2120Y(TPE2)
2SC2909(S,T)-AA
2SC3000-AA
2SC3331(S,T,U)-A
2SC945(C)-T(P,Q)
2SD400E
2SD734(E,F)-AA



2SC1740SP(R,S) TP
DTC114TSTP



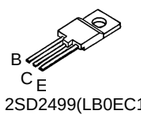
2SD1667(R,S)



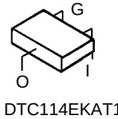
2SC2621(D,E)-RAC

2SA1037AKT146R,S
2SA1037KT147(R,S)
2SC2412KT146 R,S

SG-276

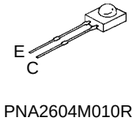


2SD2499(LB0EC1)



DTC114EKAT146
DTC124EKAT146
DTC144EKAT146

DTA124ESTP
DTC114ESTP



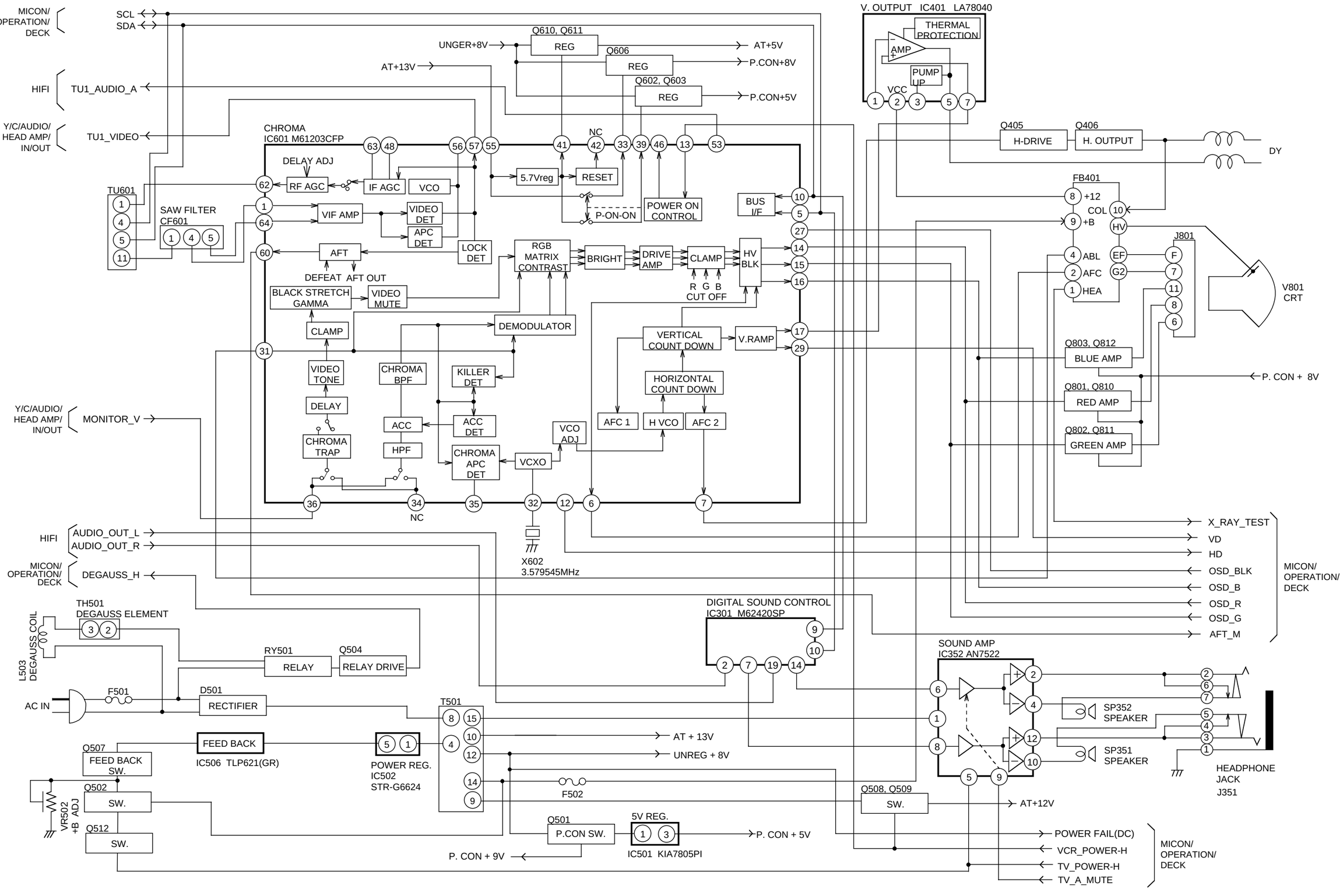
PNA2604M010R

RPI-301

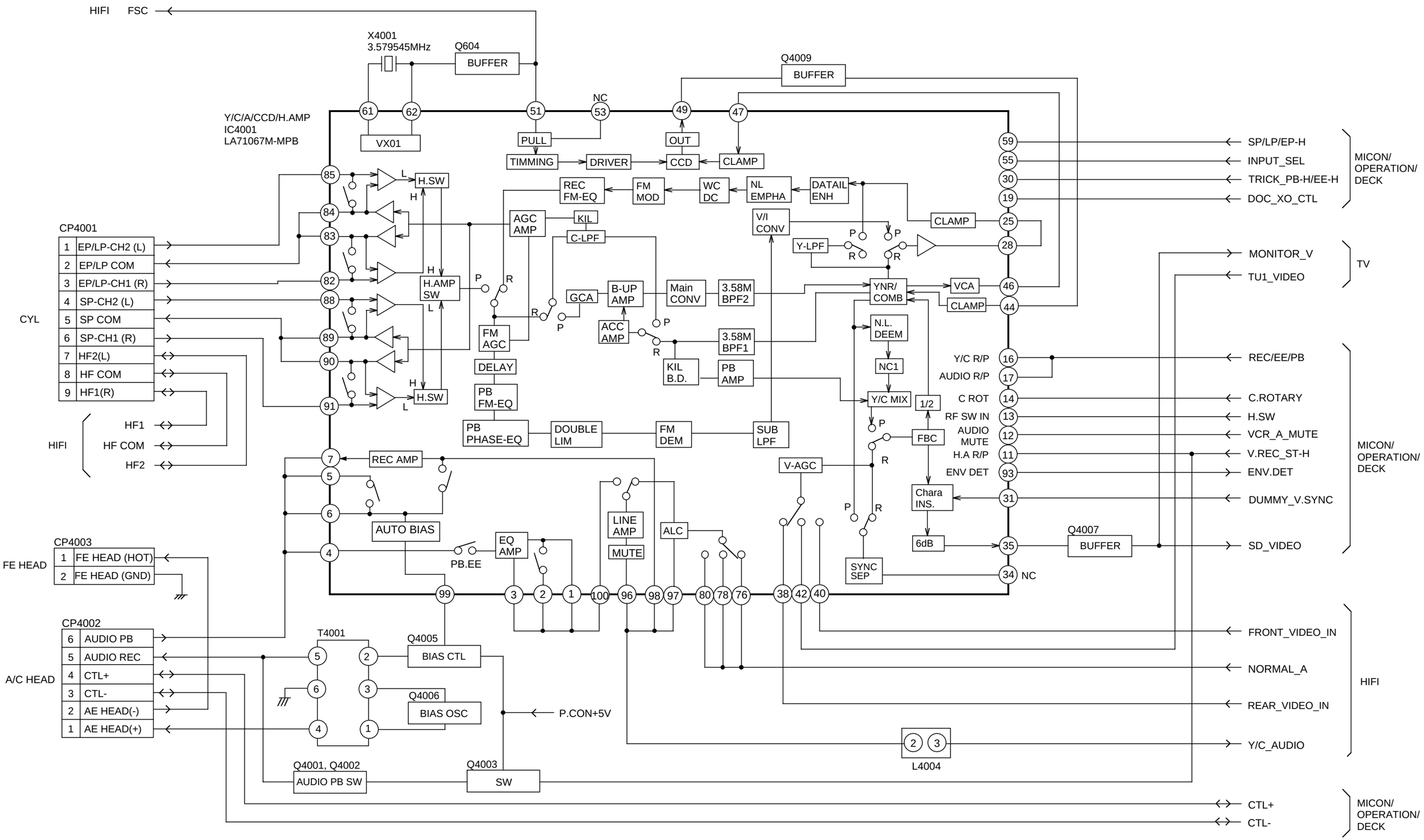
No.51768
2-51

BLOCK DIAGRAMS

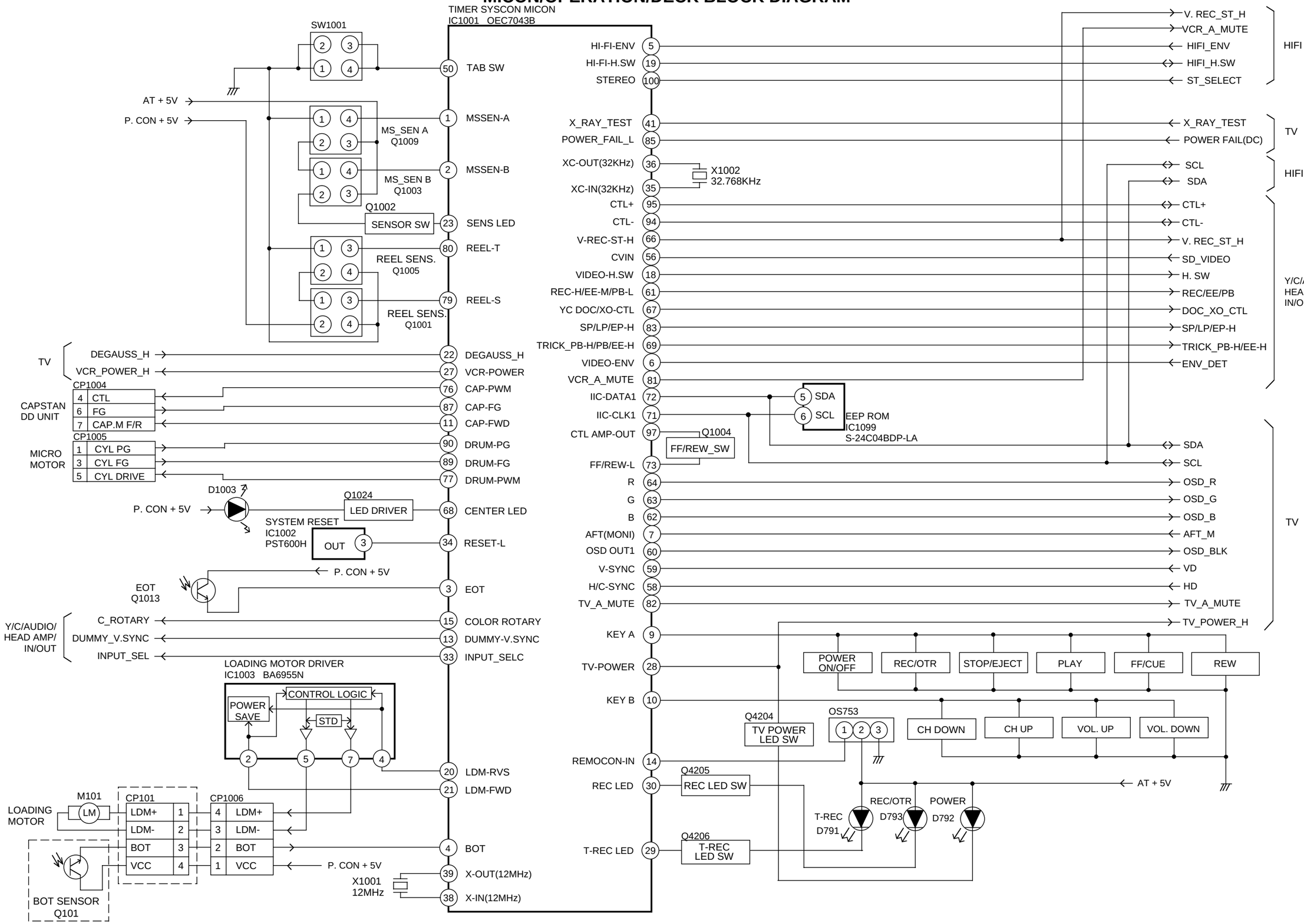
TV BLOCK DIAGRAM



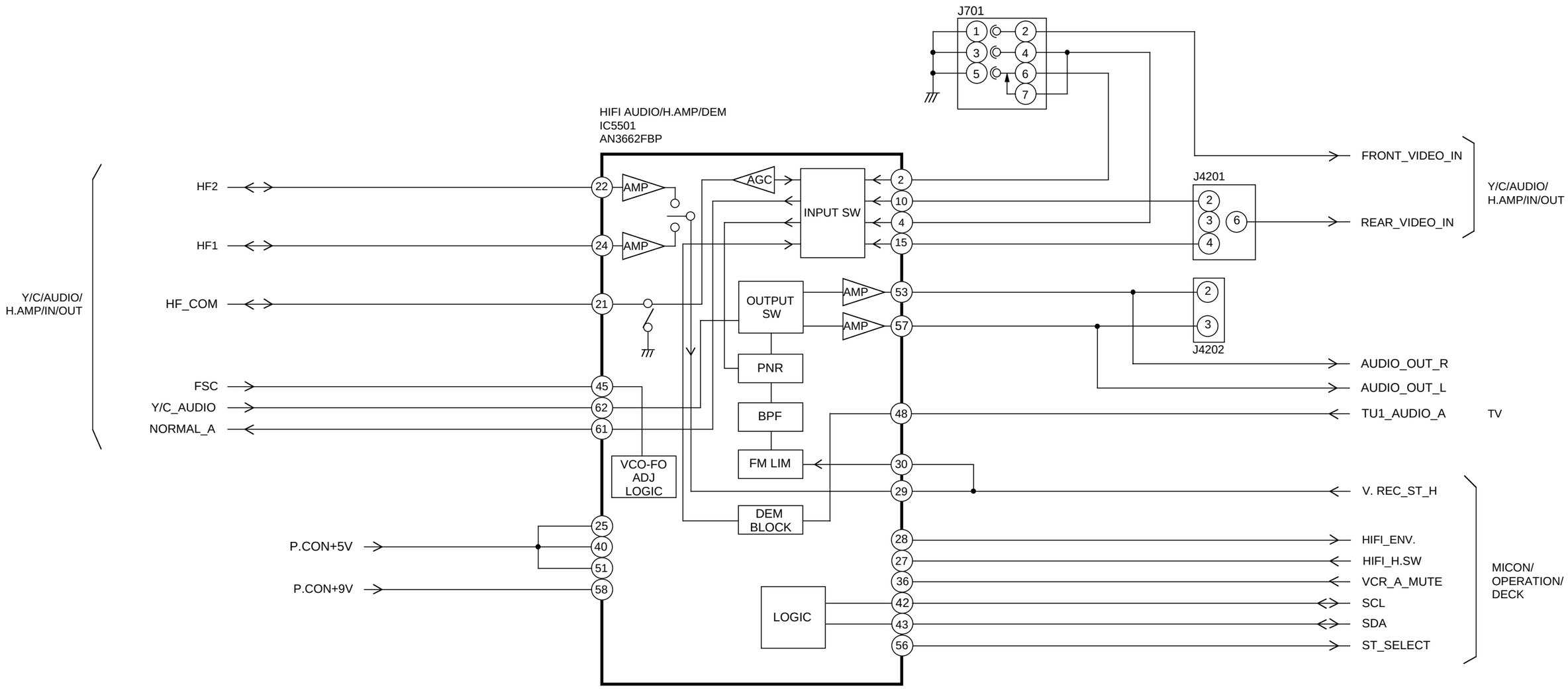
Y/C/AUDIO/HEAD AMP/IN/OUT BLOCK DIAGRAM



MICON/OPERATION/DECK BLOCK DIAGRAM



HIFI BLOCK DIAGRAM



WIRING CONNECTION DIAGRAM

INTERCONNECTION DIAGRAM

OPERATION PCB
PCB030
TEXA17

REMOCON SENSOR
OS753
3 GND
2 B+
1 Vout

TM101

COMB FILTER PCB
PCB300
VEX911

CD751 — CP4201
1 REMOCON OUT
2 GND
3 AT+5V
4 POWER ON L
5 OTPB LED
6 KEY A
7 T-REC LED
8 REC LED
9 KEY B
10 ON TIMER LED
11 CS REC LED
12 PLAY LED

CY901 — CR604
1 P.CON+5V
2 FSC
3 GND
4 C IN
5 Y IN
6 MONITOR V OUT

SPEAKER 16 OHM SP351
SPEAKER 16 OHM SP352
CD351 — CP351
1 SP OUT L+
2 SOUND L-

J351
J701

AV PCB
PCB250
TEXA18

CD353 — CP4202
1 FRONT VIDEO IN 1
2 GND 2
3 FRONT AUDIO IN 3
4 SOUND GND 4
5 SOUND OUT 5
6 SP OUT 6
7 GND 7

SYSCON PCB
PCB010
VMX188

HALL SENSOR
MAIN COIL
ROTOR MAGNET
MR FG SENSOR (VCC O G)
HALL VCC
HALL IN
OUT SWITCH LOGIC

CP1004
1 GND 1
2 MOTOR GND 2
3 I LIMIT 3
4 CTL 4
5 VCO 5
6 FG 6
7 CAP.M F/R 7
8 VCC(5V) 8

CAPSTAN DD UNIT
DECK MECHA ASS'Y
M2001

HEAD AUDIO CONTROL ASS'Y
H5001

CP4002 — FFC
6 AUDIO PB
5 AUDIO REC
4 CTL+
3 CTL-
2 AE HEAD(-)
1 AE HEAD(+)
→ AUDIO, CONTROL, AE

CP4003
FE HEAD (GND) 2
FE HEAD (HOT) 1
FULL ERASE HEAD ASS'Y
H5002

DECK PCB
PCB550
VE8851

CP1006 — FFC — CP101
VCC
BOT
LDM-
LDM+
RED
WHITE
Q101
BOT SENSOR
LM
LOADING MOTOR
M101

CP601
SOUND+B 1
SOUND GND 2
H.OUT 3
GND 4
V.FEEDBACK 5
V.OUT 6
ACL 7
H.PULSE 8
TV POWER H 9
POWER FAIL 10
X-RAY TEST 11
VCR POWER H 12
DEGAUSS H 13

CP820
SOUND+B
SOUND GND
H.OUT
GND
V.FEEDBACK
V.OUT
ACL
H.PULSE
TV POWER H
POWER FAIL
X-RAY TEST
VCR POWER H
DEGAUSS H

CP810
GND
GND
AT+12V
MOTOR GND
UNREG+8V
UNREG+8V
AT+13V
AT+30V

CRT
ANODE
H.V
V801
DY
CP401
FBT
FB401
CRT SOCKET
J801
CD801

CD810
GND 1
GND 2
AT+12V 3
MOTOR GND 4
UNREG+8V 5
UNREG+8V 6
AT+13V 7
AT+30V 8

CD850
B.OUT 1
R.OUT 2
G.OUT 3
CUT OFF 4
GND 5

CP801
GND A 1
GND A 2

CP803A — CD803 — CP803B
HEATER 1
GND A 2
GND A 3
NC 4
180V 5

CP850
B.OUT 1
R.OUT 2
G.OUT 3
CUT OFF 4
GND 5

DEGAUSS COIL L503
CP502
CP501
CD501 AC100V 50/60Hz
SCREEN
FOCUS
CP807
SCREEN 1

MAIN PCB
PCB070
TMX460

CRT PCB
PCB110
TCX320

TU6002 — TU601
11 IF
9 +30V
7 +5V
6 SDA
5 SCL
3
2 AGC
NC

J4201 J4202

CP1005 — FFC — CD2001
CYL DRIVE 5
CYL GND 4
CYL FG 3
CYL +B 2
CYL PG 1

MICRO MOTOR
M2003
VCC
DRIVE CONTROL
GND
FG
PG
FG.PG GND

CYLINDER UNIT ASS'Y
UN4001

CP4001
SP-CH2 (L)
SP COM
SP-CH1 (R)
CH2
CH1
SP HEAD

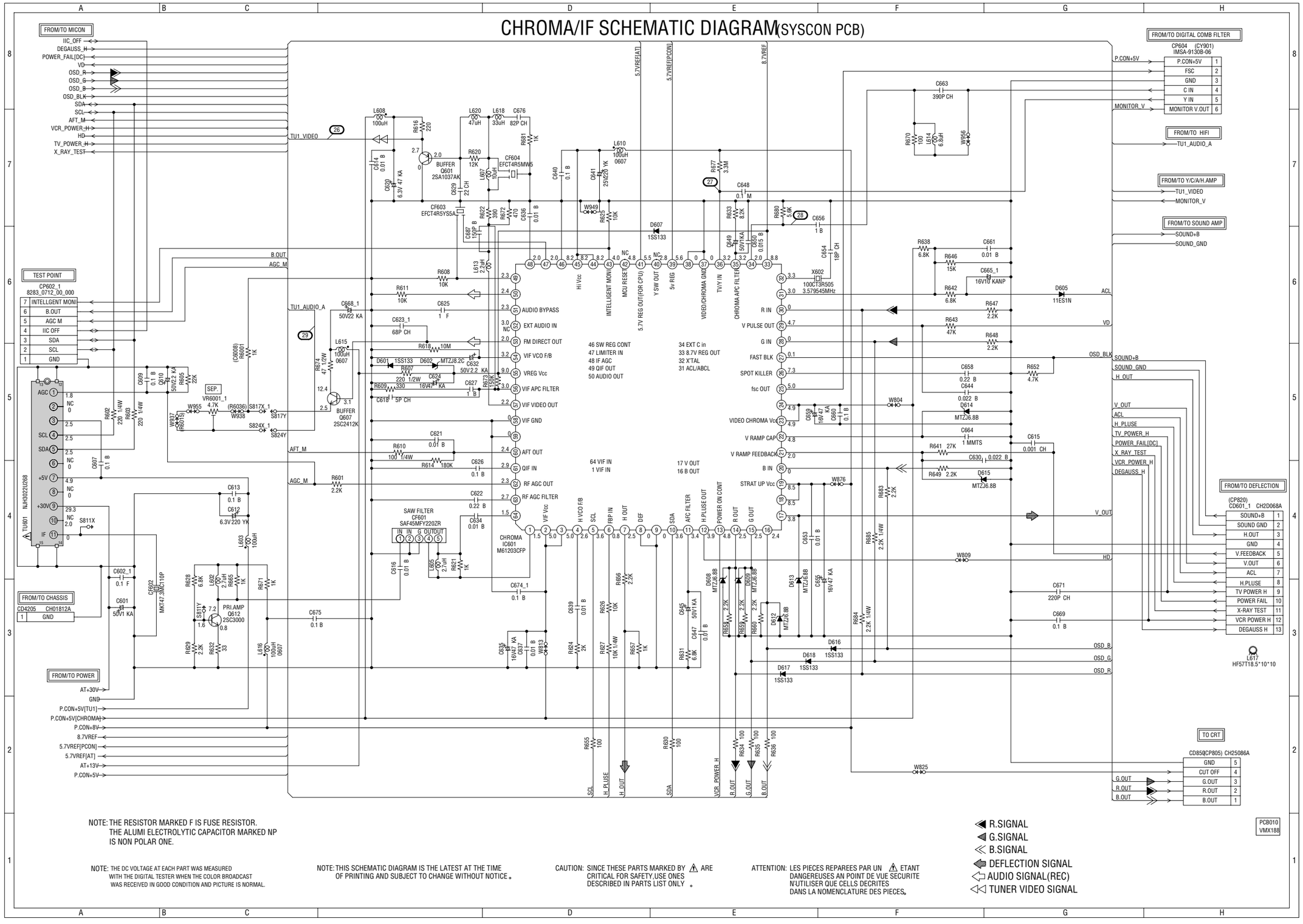
CAUTION: SINCE THESE PARTS MARKED BY ⚠ ARE CRITICAL FOR SAFETY,USE ONES DESCRIBED IN PARTS LIST ONLY 。

ATTENTION: LES PIECES REPAREES PAR UN ⚠ ETANT DANGEREUSES AN POINT DE VUE SECURITE N'UTILISER QUE CELLS DECRITES DANS LA NOMENCLATURE DES PIECES。

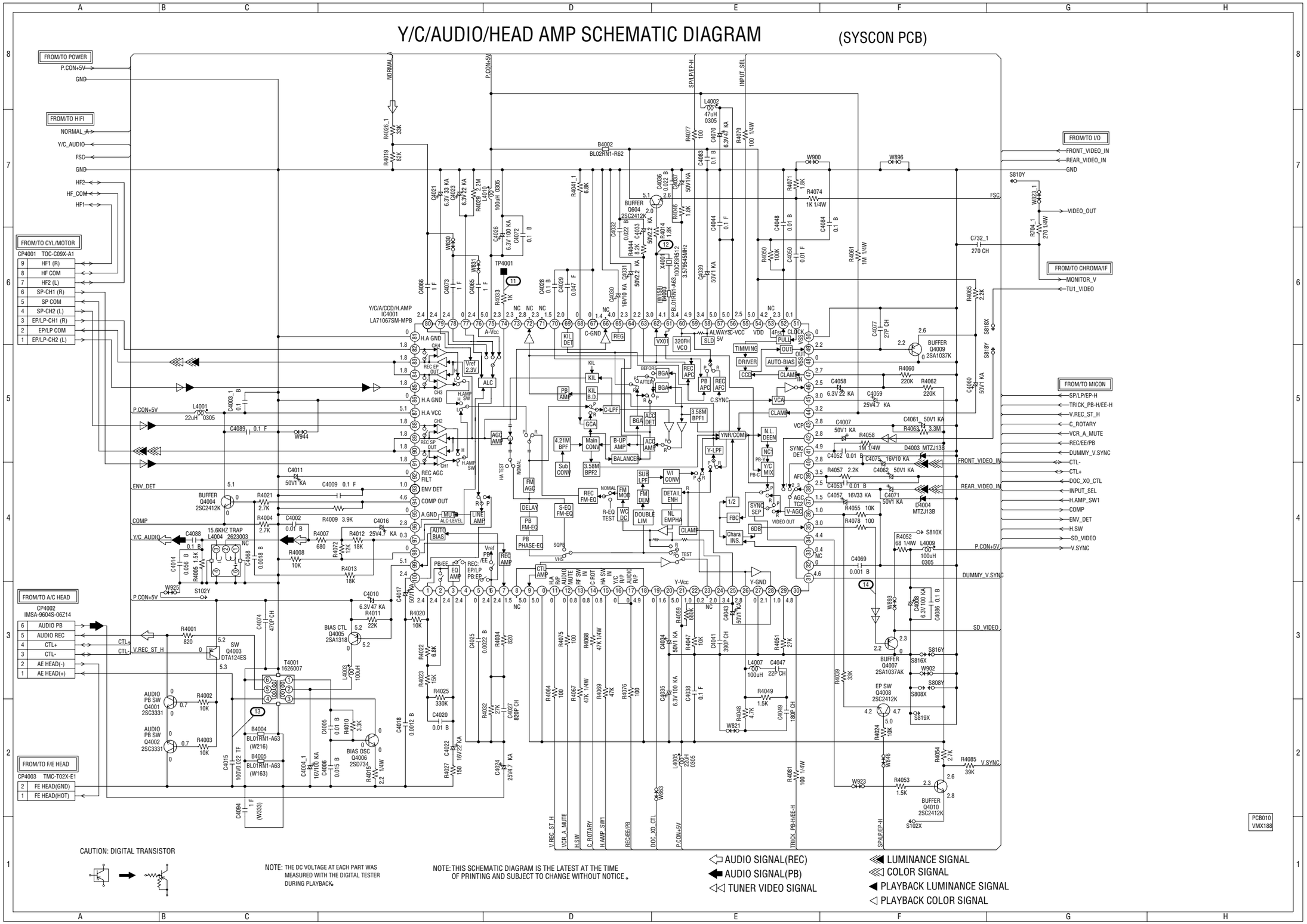
NOTE: THIS INTERCONNECTION DIAGRAM IS THE LATEST AT THE TIME OF PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE 。

CIRCUIT DIAGRAM

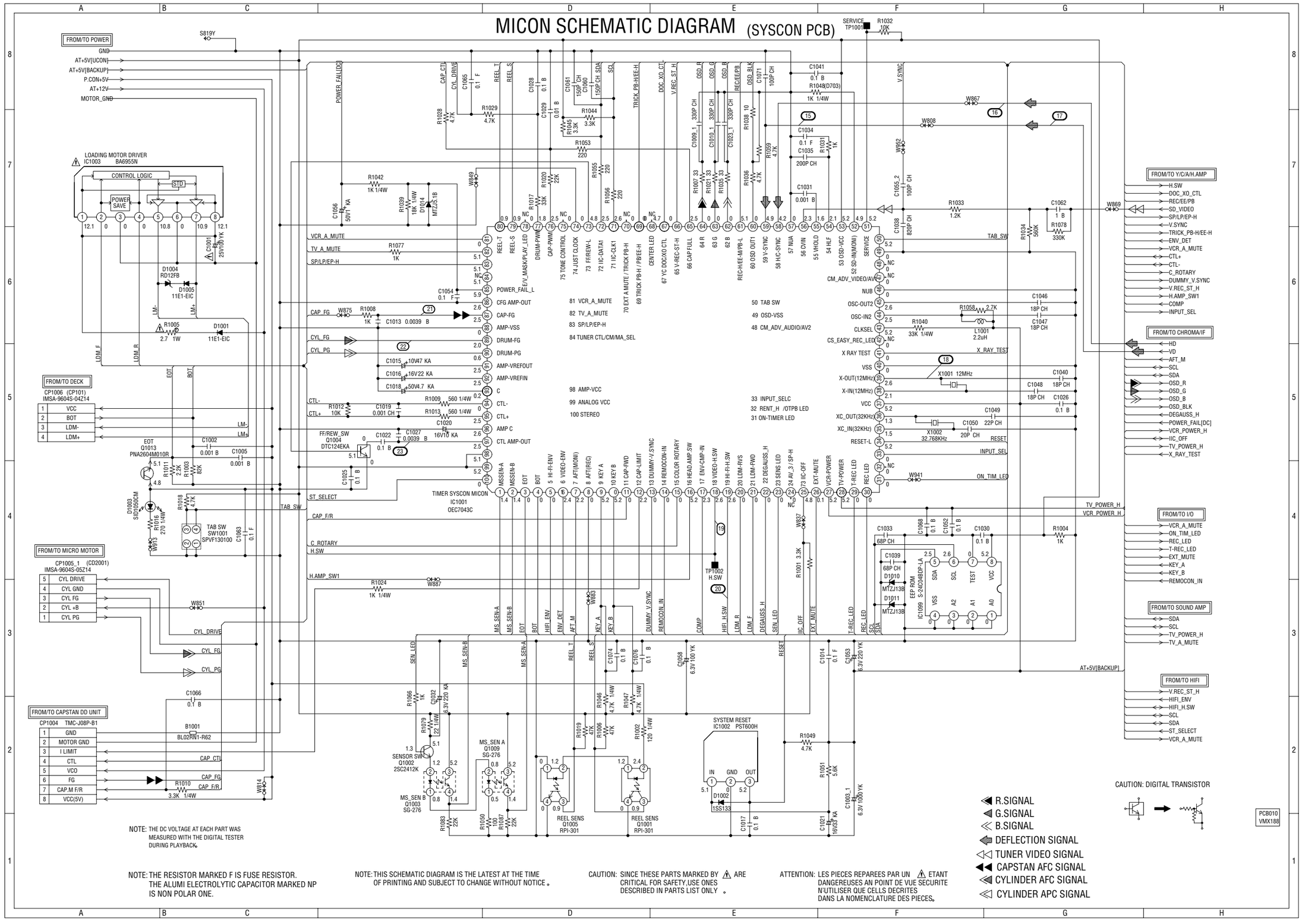
[SYSCON PCB CHROMA/IF SCHEMATIC DIAGRAM]



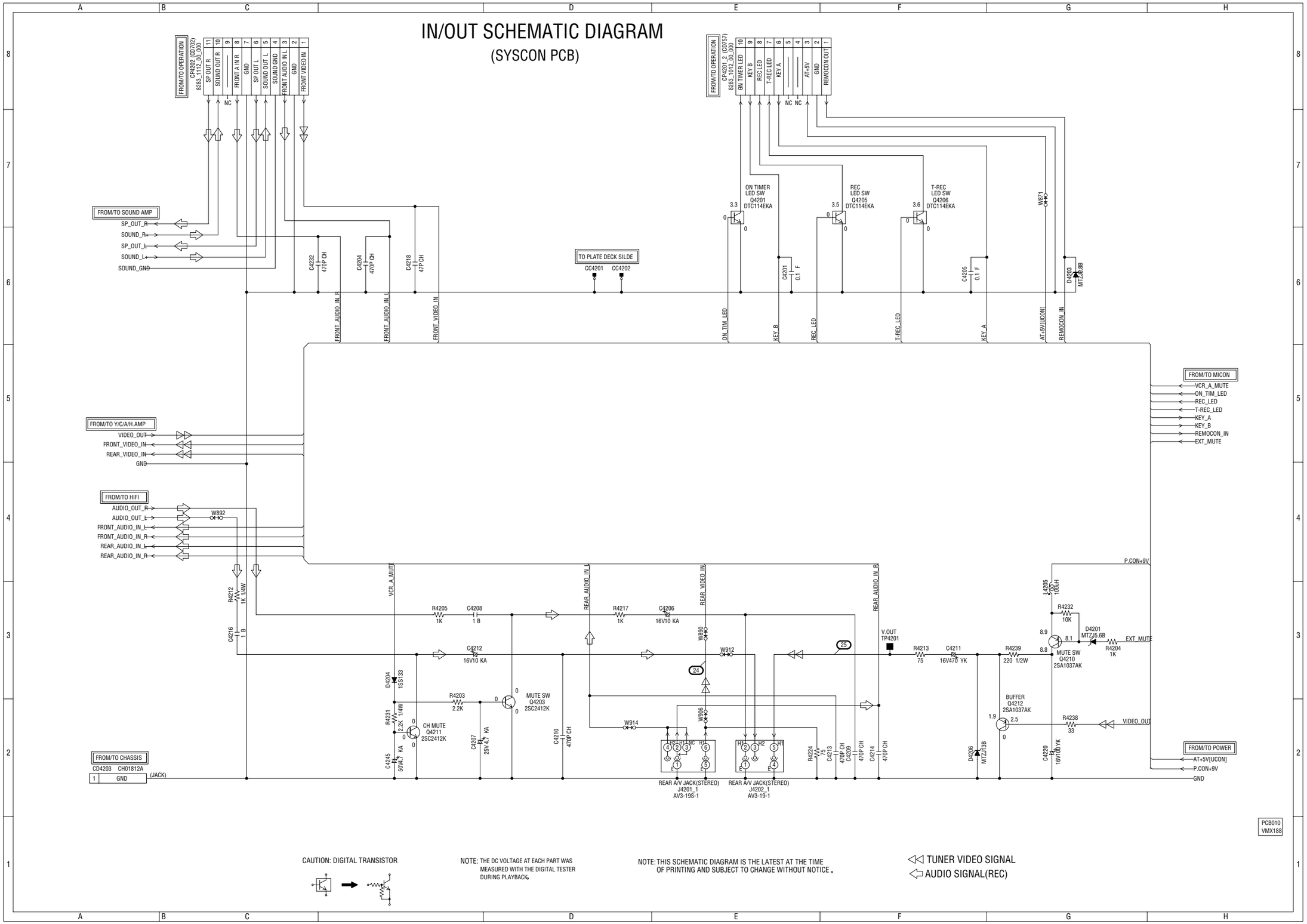
[SYSCON PCB Y/C/AUDIO/HEAD AMP SCHEMATIC DIAGRAM]



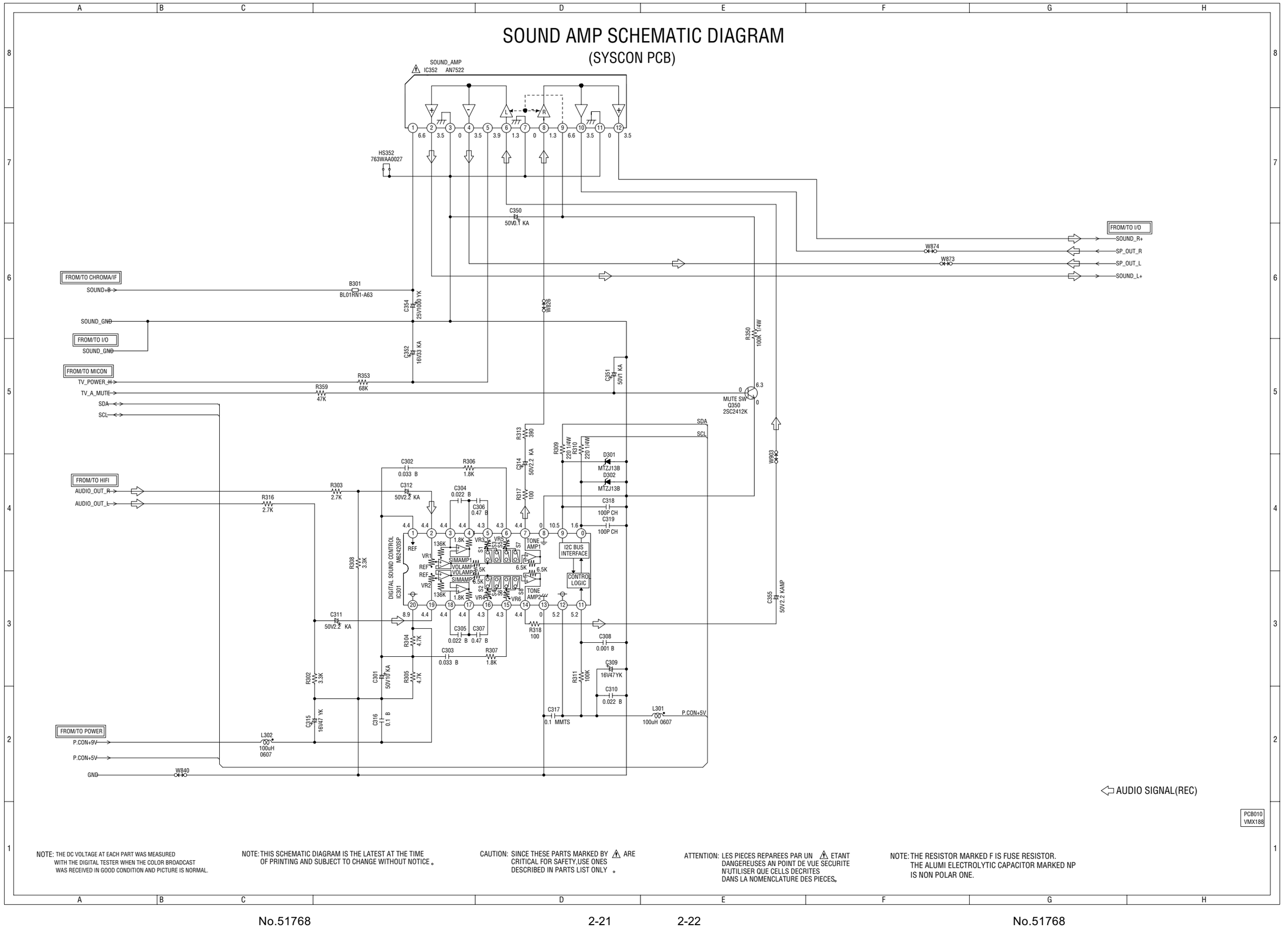
[SYSCON PCB MICON DIAGRAM]



[SYSCON PCB IN/OUT DIAGRAM]



[SYSCON PCB SOUND AMP CIRCUIT DIAGRAM]



NOTE: THE DC VOLTAGE AT EACH PART WAS MEASURED WITH THE DIGITAL TESTER WHEN THE COLOR BROADCAST WAS RECEIVED IN GOOD CONDITION AND PICTURE IS NORMAL.

NOTE: THIS SCHEMATIC DIAGRAM IS THE LATEST AT THE TIME OF PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE 。

CAUTION: SINCE THESE PARTS MARKED BY ⚠ ARE CRITICAL FOR SAFETY,USE ONES DESCRIBED IN PARTS LIST ONLY 。

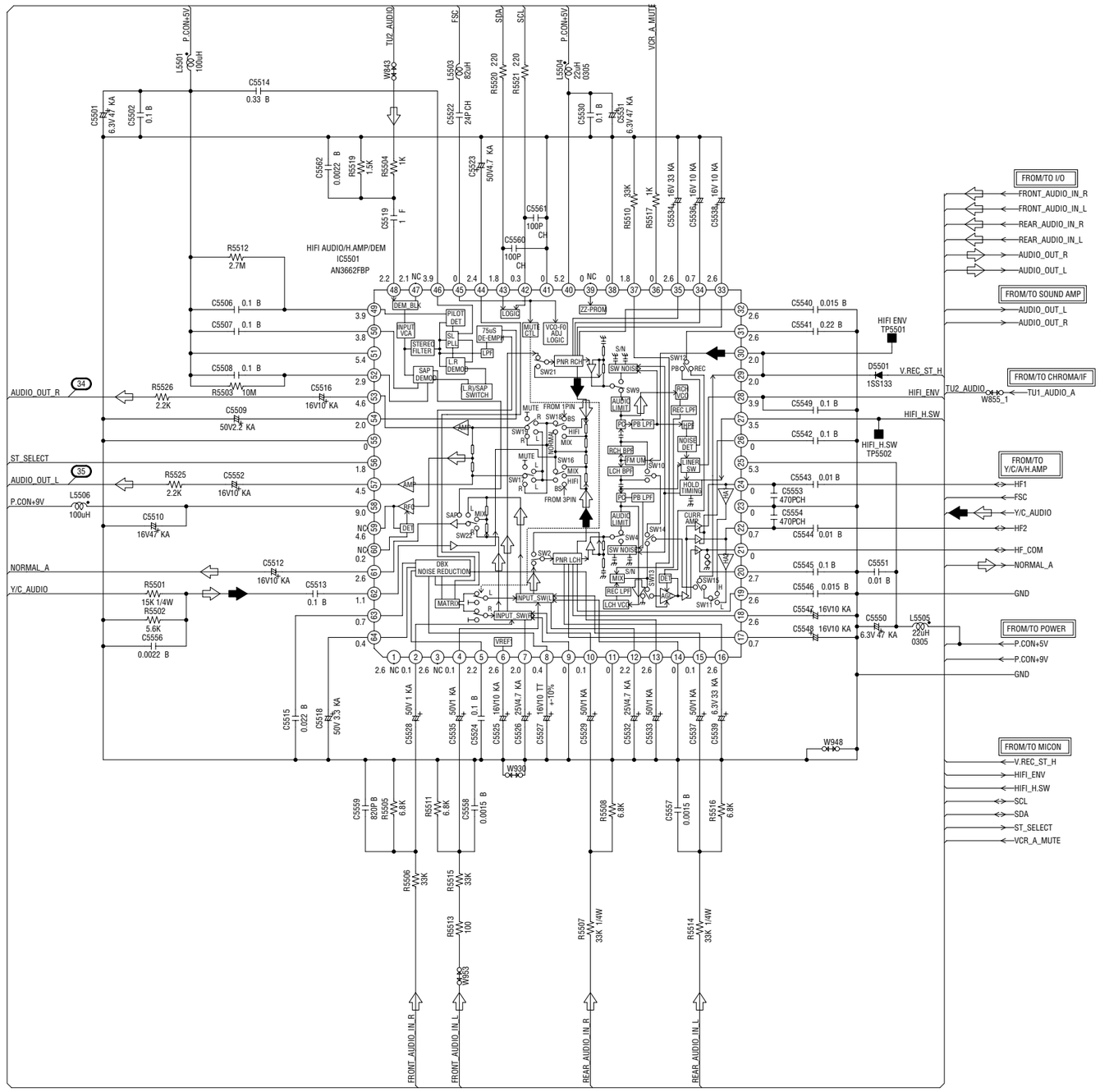
ATTENTION: LES PIECES REPAREES PAR UN ⚠ ETANT DANGEREUSES AN POINT DE VUE SECURITE N'UTILISER QUE CELLS DECRITES DANS LA NOMENCLATURE DES PIECES。

NOTE: THE RESISTOR MARKED F IS FUSE RESISTOR. THE ALUMI ELECTROLYTIC CAPACITOR MARKED NP IS NON POLAR ONE.

[SYSCON PCB HIFI CIRCUIT DIAGRAM]

HIFI SCHEMATIC DIAGRAM

(SYSCON PCB)



NOTE: THE DC VOLTAGE AT EACH PART WAS MEASURED WITH THE DIGITAL TESTER DURING PLAYBACK.

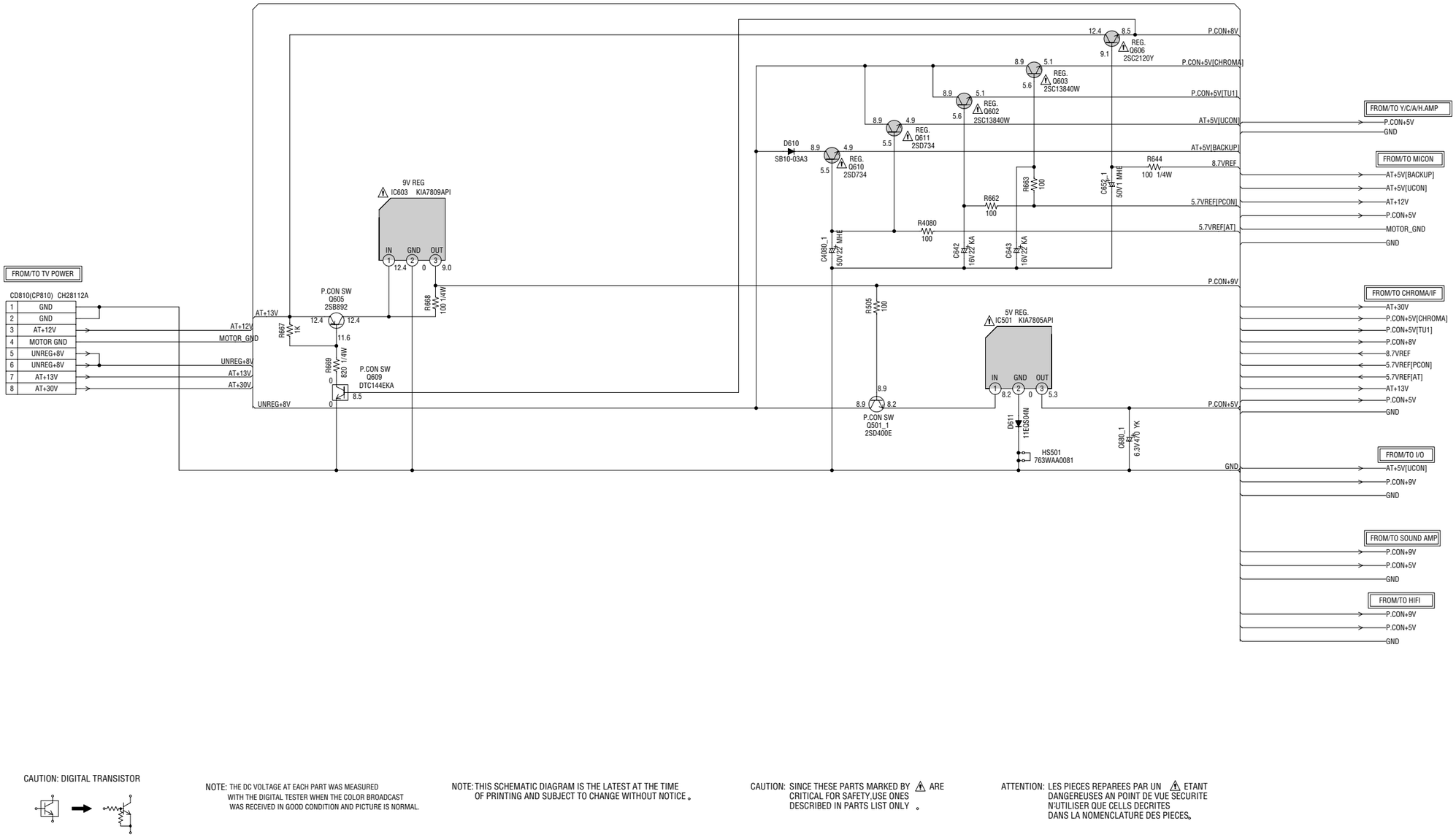
NOTE: THIS SCHEMATIC DIAGRAM IS THE LATEST AT THE TIME OF PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE.

⇦ AUDIO SIGNAL(REC)
⬅ AUDIO SIGNAL(PB)

[SYSCON PCB POWER CIRCUIT DIAGRAM]

POWER SCHEMATIC DIAGRAM

(SYSCON PCB)



CAUTION: DIGITAL TRANSISTOR

NOTE: THE DC VOLTAGE AT EACH PART WAS MEASURED WITH THE DIGITAL TESTER WHEN THE COLOR BROADCAST WAS RECEIVED IN GOOD CONDITION AND PICTURE IS NORMAL.

NOTE: THIS SCHEMATIC DIAGRAM IS THE LATEST AT THE TIME OF PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE 。

CAUTION: SINCE THESE PARTS MARKED BY ⚠ ARE CRITICAL FOR SAFETY.USE ONES DESCRIBED IN PARTS LIST ONLY 。

ATTENTION: LES PIECES REPAREES PAR UN ⚠ ETANT DANGEREUSES AN POINT DE VUE SECURITE N'UTILISER QUE CELLS DECRITES DANS LA NOMENCLATURE DES PIECES。

[MAIN PCB TV POWER CIRCUIT DIAGRAM]

TV POWER SCHEMATIC DIAGRAM (MAIN PCB)

6.3A 125V 2.5A 125V

CAUTION: FOR CONTINUED PROTECTION AGAINST FIRE HAZARD, REPLACE ONLY WITH THE SAME TYPE FUSE 6.3A 125V(F501) ,2.5A 125V(F502).

ATTENTION: POUR UNE PROTECTION CONTINUE LES RISQUES D'INCEIE N'UTILISER QUE DES FUSIBLE DE MEME TYPE 6.3A 125V(F501) ,2.5A 125V(F502).

CAUTION: DIGITAL TRANSISTOR

CAUTION: ⏚ IS THE LIVE CONNECTION

NOTE: THE RESISTOR MARKED F IS FUSE RESISTOR. THE ALUMI ELECTROLYTIC CAPACITOR MARKED NP IS NON POLAR ONE.

NOTE: THE DC VOLTAGE AT EACH PART WAS MEASURED WITH THE DIGITAL TESTER WHEN THE COLOR BROADCAST WAS RECEIVED IN GOOD CONDITION AND PICTURE IS NORMAL.

NOTE: THIS SCHEMATIC DIAGRAM IS THE LATEST AT THE TIME OF PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE。

CAUTION: SINCE THESE PARTS MARKED BY ⚠ ARE CRITICAL FOR SAFETY,USE ONES DESCRIBED IN PARTS LIST ONLY 。

ATTENTION: LES PIECES REPAREES PAR UN ⚠ ETANT DANGEREUSES AN POINT DE VUE SECURITE N'UTILISER QUE CELLS DECRITES DANS LA NOMENCLATURE DES PIECES。

PCB070 TMX465

[MAIN PCB DEFLECTION CIRCUIT DIAGRAM]

DEFLECTION SCHEMATIC DIAGRAM (MAIN PCB)

V.OUTPUT IC401 LA78040
THERMAL PROTECTION
AMP
PUMP UP
GND
Vcc
1 3.9 2 25.5 3 1.3 4 0 5 12.9 6 24.8 7 3.9

FROM/TO CHROMA/IF
CP820_1(CD601) 8283_1312_00_000
1 SOUND+B
2 SOUND GND
3 H.OUT
4 GND
5 V.FEEDBACK
6 V.OUT
7 ACL
8 H.PULSE
9 TV POWER H
10 POWER FAIL
11 X-RAY TEST
12 VCR POWER H
13 DEGAUSS H

FROM/TO TV POWER
TV.POWER_H
VCR.POWER_H
SOUND+B
SOUND_GND
DEGAUSS_H
POWER_FAIL
P.CON+111V
GND
PROTECT
+B

TO DY
CP401 B05B-DVS
5 4 3 NC 2 1

TO CRT
CD802_1 CP83035A
3 2 1

FB401 3221011Q
272.0 COL 10
113.8 +180 5
110.4 +B 9
25.3 AFC 2
6.5 HEATER 1
22.1 NC 6
0 GND 3
30.9 NC 7
63.2 +12 8
H1
EF
G2
GND
ABL 4
7.1

FOCUS
SCREEN

CP803A 51052-0500
180V 5 180V
NC 4 NC
GND 3 GND
GND 2 GND
HEATER 1 HEATER
CD803 2E054402

V801 A51LSH196X01(0)
9 10 8 R 6 G 7 B 1
5 7 1

PCB070 TMX465

DEFLECTION SIGNAL

NOTE: THE DC VOLTAGE AT EACH PART WAS MEASURED WITH THE DIGITAL TESTER WHEN THE COLOR BROADCAST WAS RECEIVED IN GOOD CONDITION AND PICTURE IS NORMAL.

NOTE: THIS SCHEMATIC DIAGRAM IS THE LATEST AT THE TIME OF PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE 。

NOTE: THE RESISTOR MARKED F IS FUSE RESISTOR. THE ALUMI ELECTROLYTIC CAPACITOR MARKED NP IS NON POLAR ONE.

ATTENTION: LES PIECES REPAREES PAR UN ⚠ ETANT DANGEREUSES AN POINT DE VUE SECURITE N'UTILISER QUE CELLS DECRITES DANS LA NOMENCLATURE DES PIECES。

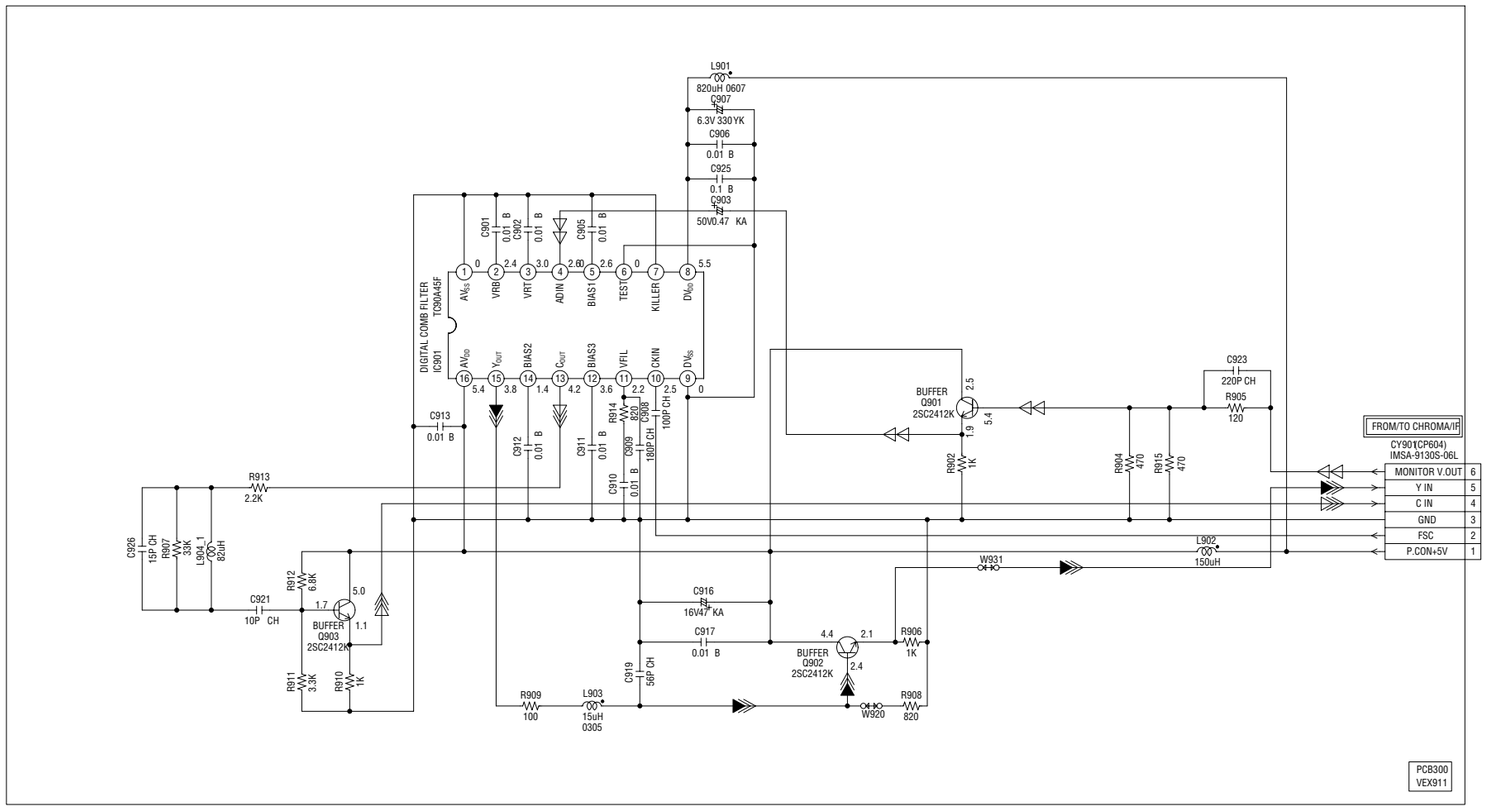
CAUTION: SINCE THESE PARTS MARKED BY ⚠ ARE CRITICAL FOR SAFETY,USE ONES DESCRIBED IN PARTS LIST ONLY 。

CAUTION: DIGITAL TRANSISTOR

[DIGITAL COMB FILTER CIRCUIT DIAGRAM]

DIGITAL COMB FILTER SCHEMATIC DIAGRAM

(COMB FILTER PCB)



NOTE: THE RESISTOR MARKED F IS FUSE RESISTOR.
THE ALUMI ELECTROLYTIC CAPACITOR MARKED NP IS NON POLAR ONE.

NOTE: THE DC VOLTAGE AT EACH PART WAS MEASURED WITH THE DIGITAL TESTER WHEN THE COLOR BROADCAST WAS RECEIVED IN GOOD CONDITION AND PICTURE IS NORMAL.

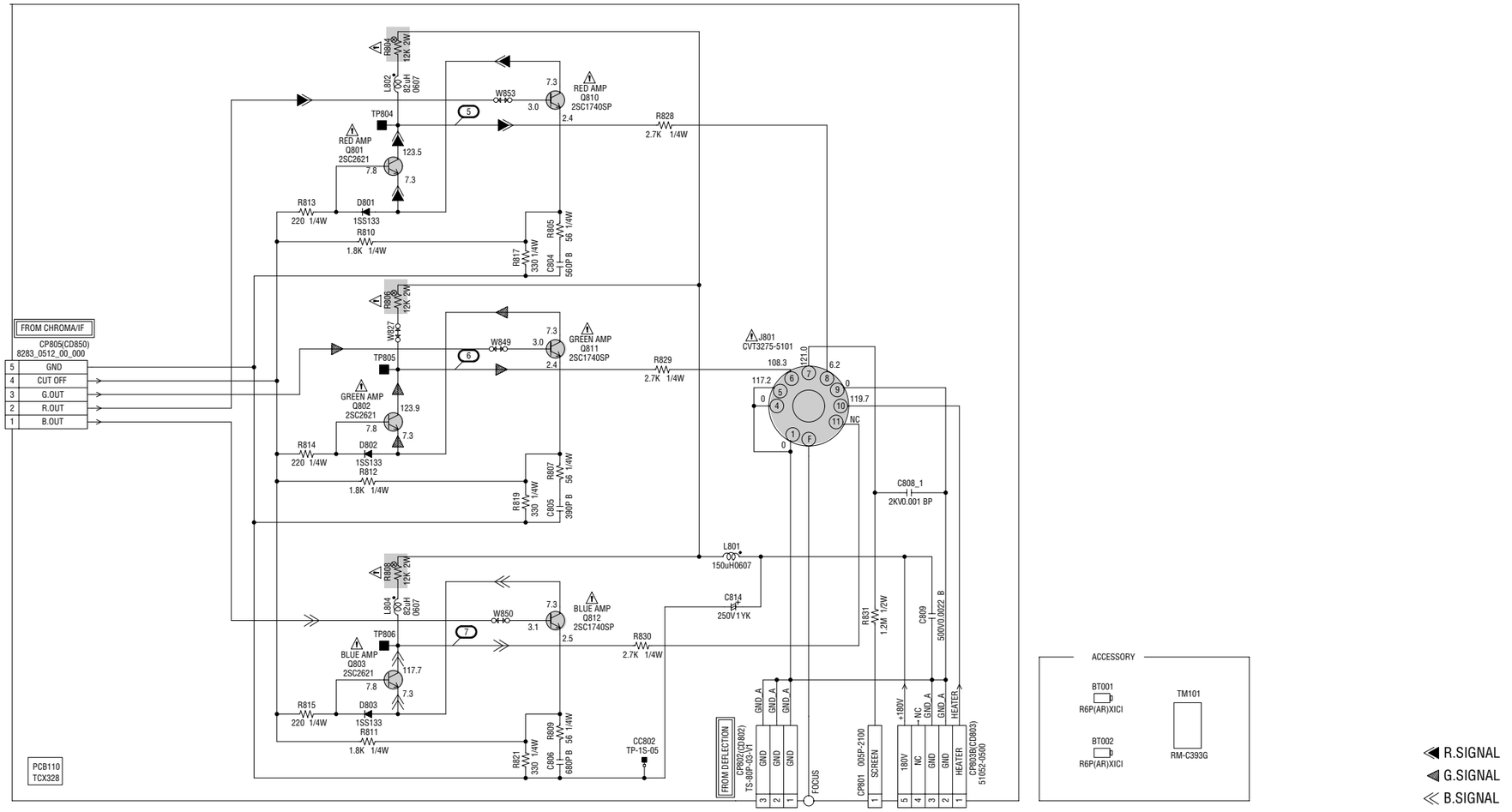
NOTE: THIS SCHEMATIC DIAGRAM IS THE LATEST AT THE TIME OF PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE。

◁◁ TUNER VIDEO SIGNAL
◀◀ LUMINANCE SIGNAL
◁◁ COLOR SIGNAL

[CRT PCB CIRCUIT DIAGRAM]

CRT SCHEMATIC DIAGRAM

(CRT PCB)



NOTE: THE DC VOLTAGE AT EACH PART WAS MEASURED WITH THE DIGITAL TESTER WHEN THE COLOR BROADCAST WAS RECEIVED IN GOOD CONDITION AND PICTURE IS NORMAL.

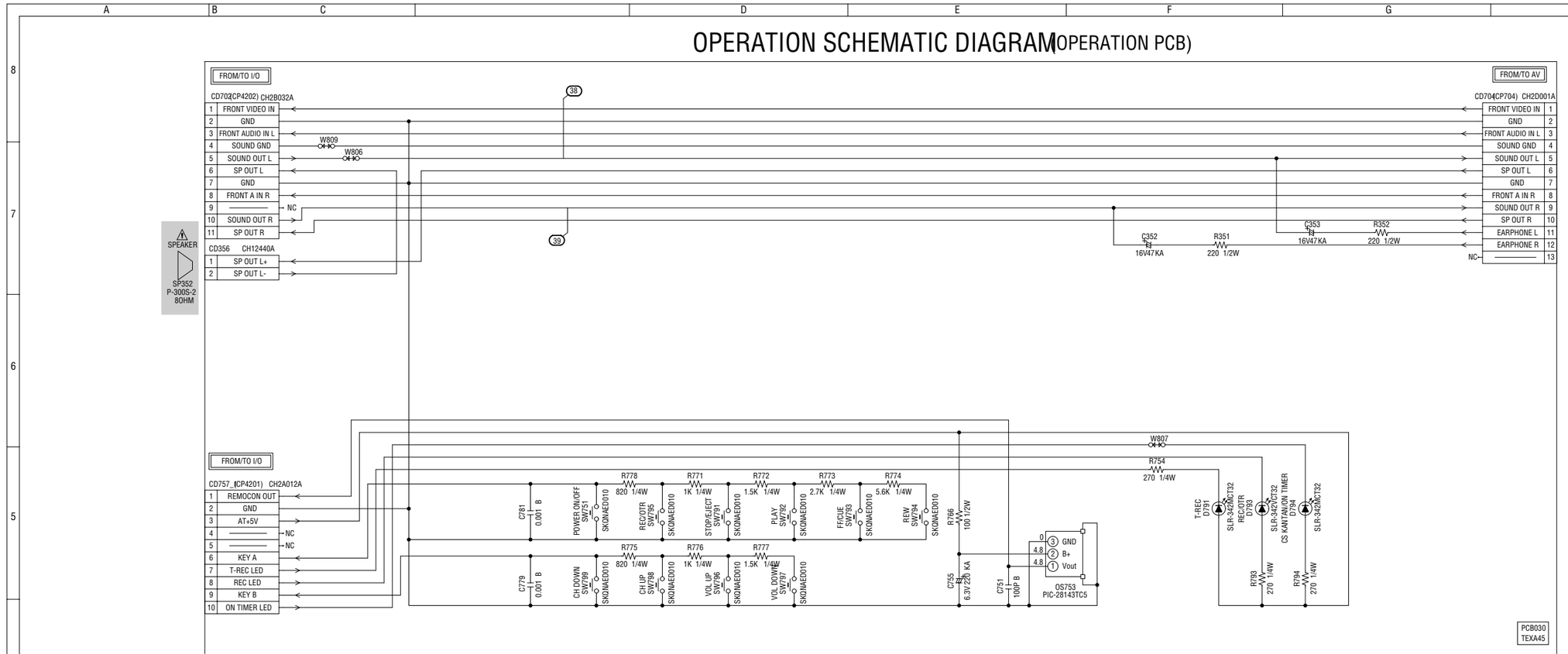
NOTE: THIS SCHEMATIC DIAGRAM IS THE LATEST AT THE TIME OF PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE 。

CAUTION: SINCE THESE PARTS MARKED BY ⚠ ARE CRITICAL FOR SAFETY.USE ONES DESCRIBED IN PARTS LIST ONLY 。

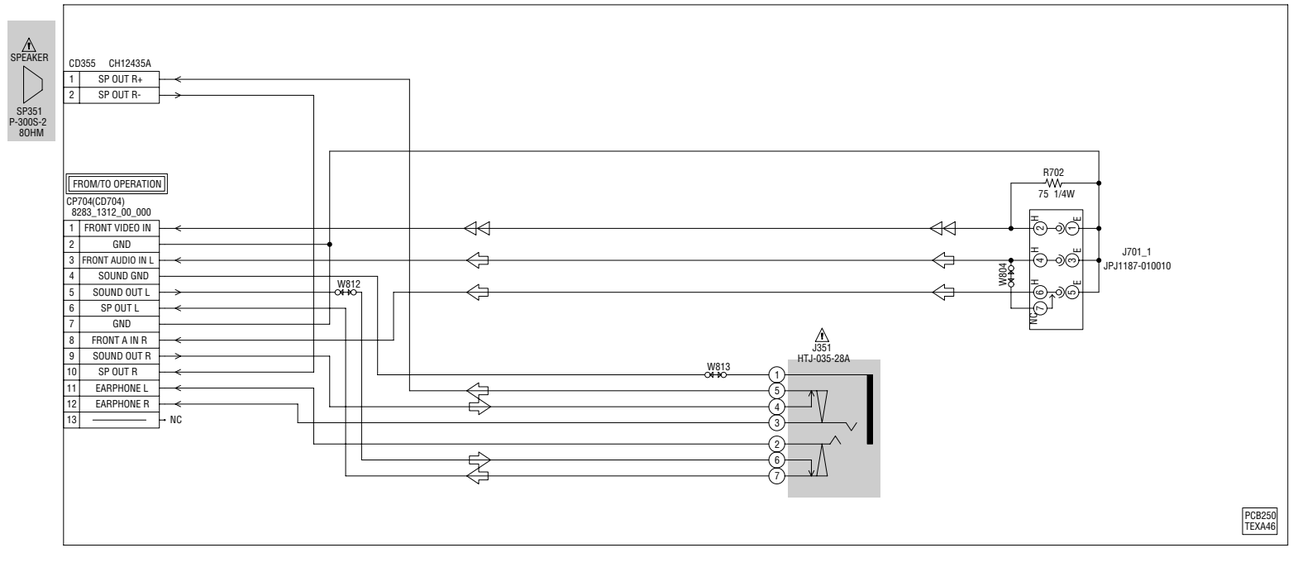
ATTENTION: LES PIECES REPAREES PAR UN ⚠ ETANT DANGEREUSES AN POINT DE VUE SECURITE N'UTILISER QUE CELLS DECRITES DANS LA NOMENCLATURE DES PIECES。

[OPERATION PCB & AV PCB CIRCUIT DIAGRAM]

OPERATION SCHEMATIC DIAGRAM (OPERATION PCB)



(AV PCB)



TUNER VIDEO SIGNAL
AUDIO SIGNAL

NOTE: THE DC VOLTAGE AT EACH PART WAS MEASURED WITH THE DIGITAL TESTER WHEN THE COLOR BROADCAST WAS RECEIVED IN GOOD CONDITION AND PICTURE IS NORMAL.

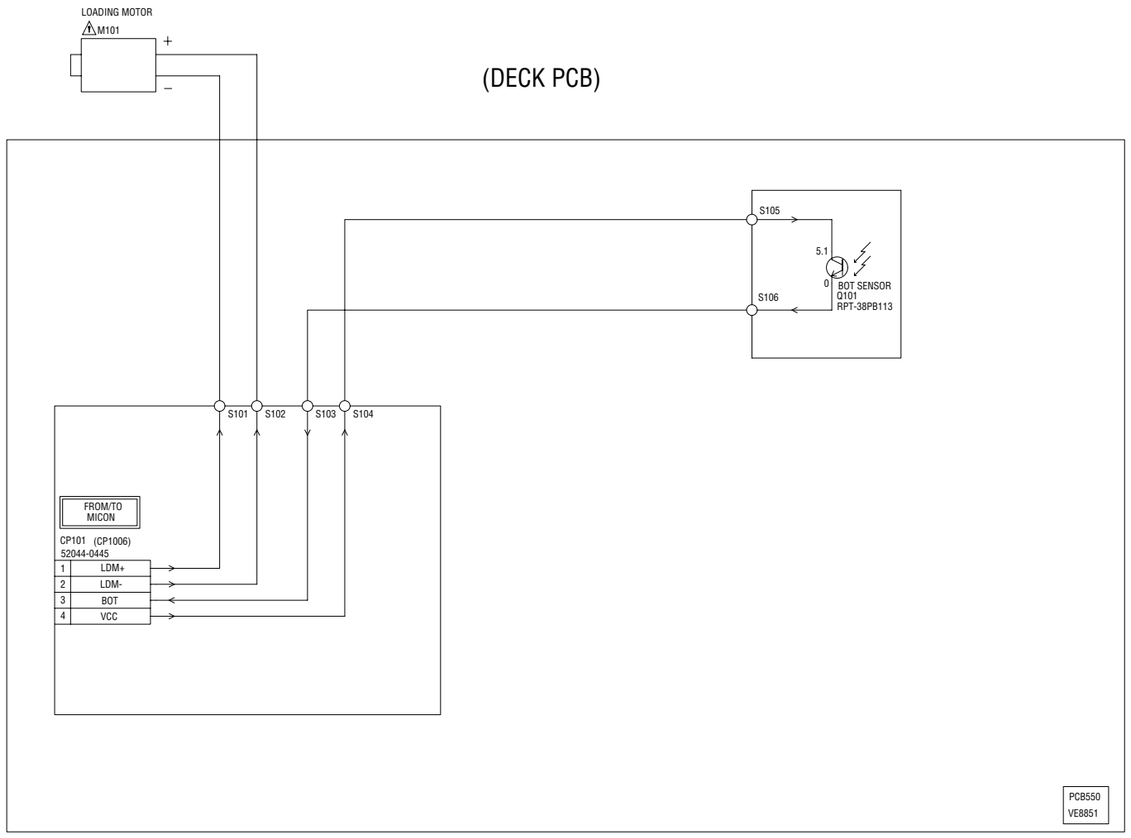
NOTE: THIS SCHEMATIC DIAGRAM IS THE LATEST AT THE TIME OF PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE 。

CAUTION: SINCE THESE PARTS MARKED BY ⚠ ARE CRITICAL FOR SAFETY,USE ONES DESCRIBED IN PARTS LIST ONLY 。

ATTENTION: LES PIECES REPAREES PAR UN ⚠ ETANT DANGEREUSES AN POINT DE VUE SECURITE N'UTILISER QUE CELLS DECRITES DANS LA NOMENCLATURE DES PIECES。

[DECK PCB CIRCUIT DIAGRAM]

DECK SCHEMATIC DIAGRAM



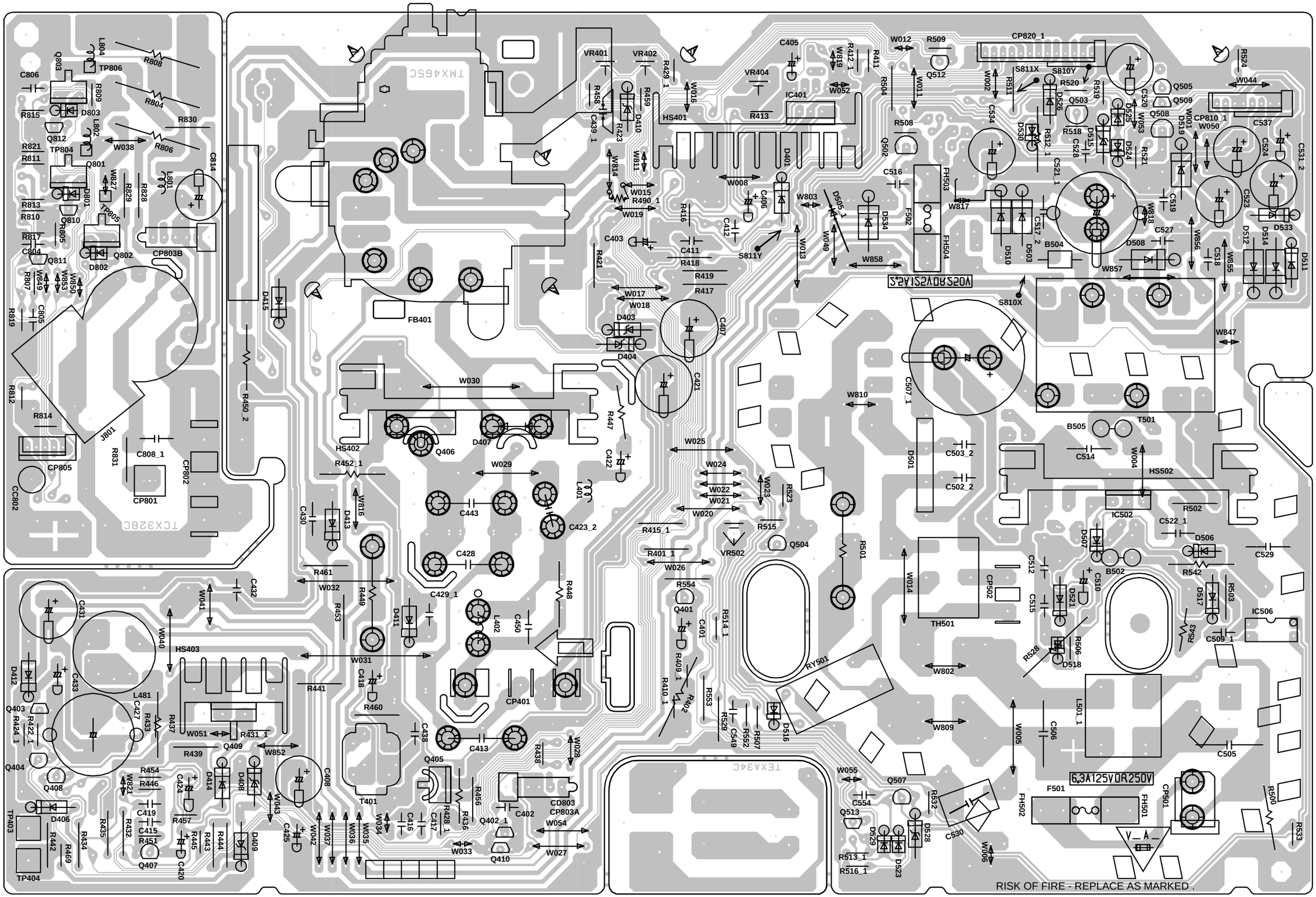
CAUTION: SINCE THESE PARTS MARKED BY ⚠ ARE CRITICAL FOR SAFETY,USE ONES DESCRIBED IN PARTS LIST ONLY 。

ATTENTION: LES PIECES REPAREES PAR UN ⚠ ETANT DANGEREUSES AN POINT DE VUE SECURITE N'UTILISER QUE CELLS DECRITES DANS LA NOMENCLATURE DES PIECES。

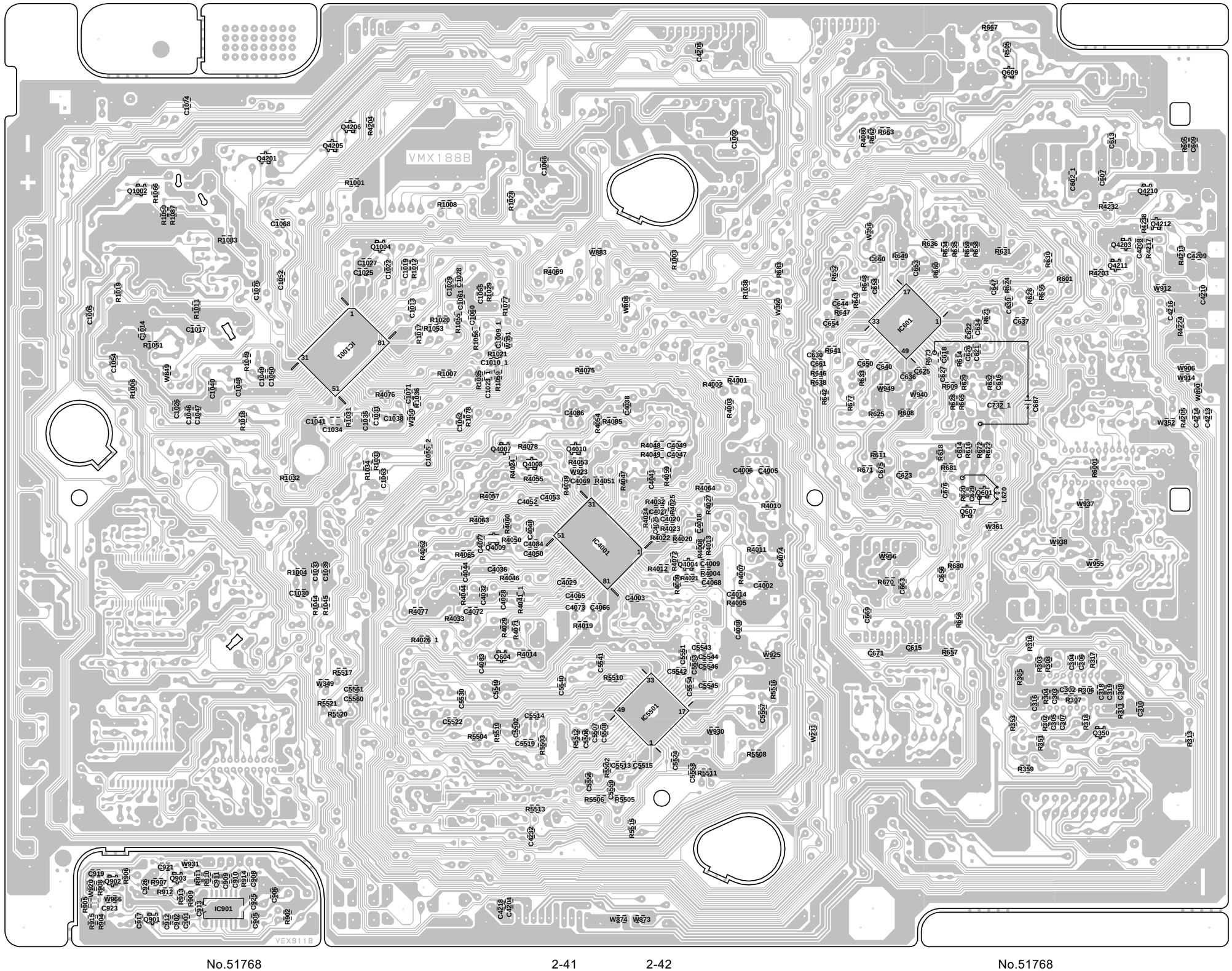
NOTE: THE DC VOLTAGE AT EACH PART WAS MEASURED WITH THE DIGITAL TESTER DURING PLAYBACK。

NOTE: THIS SCHEMATIC DIAGRAM IS THE LATEST AT THE TIME OF PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE 。

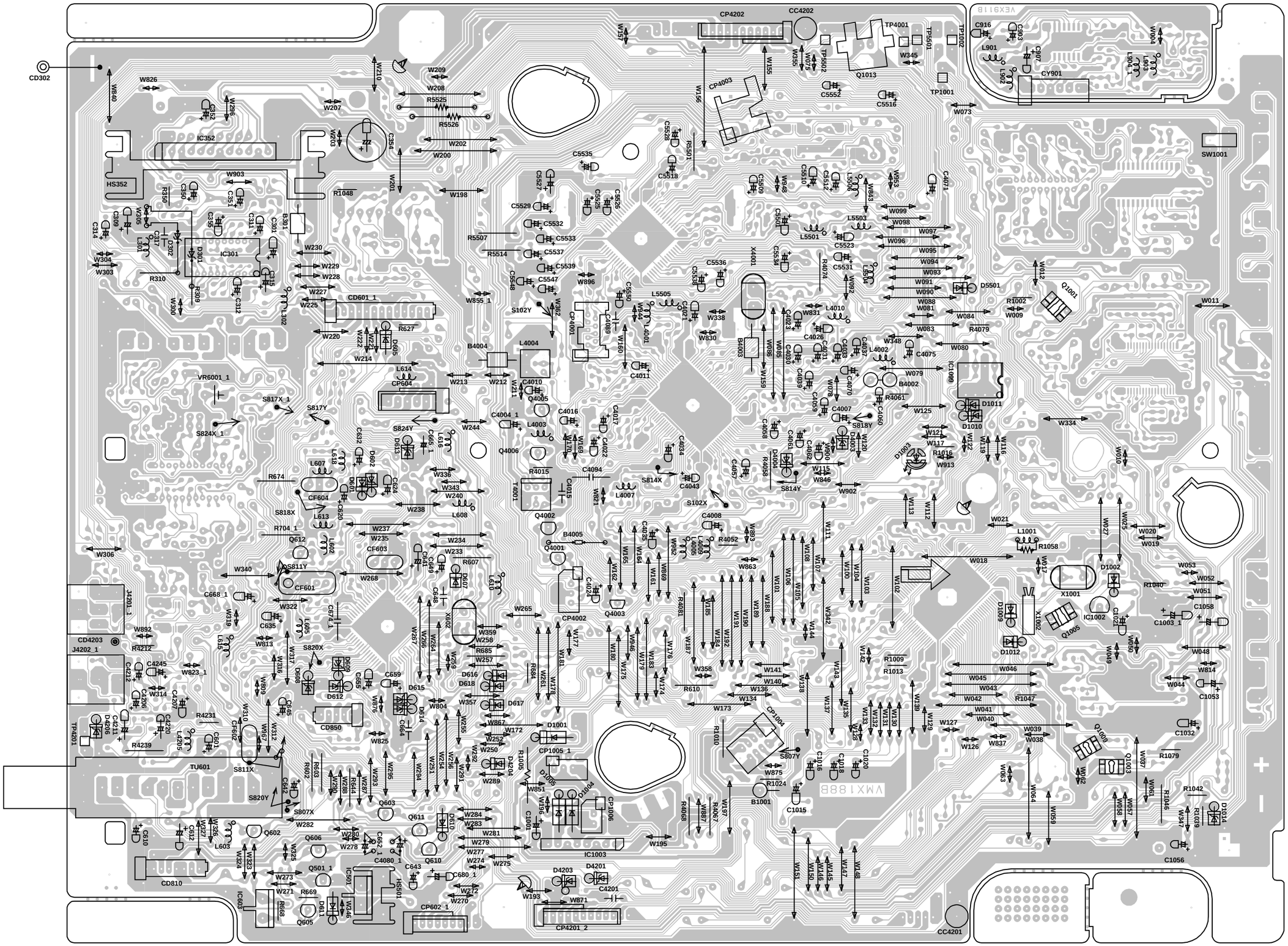
[MAIN/CRT PCB PATTERN]



[SYSCON/ COMB FILTER PCB PATTERN (CHIP MOUNTED PARTS)]



[SYSCON/ COMB FILTER PCB PATTERN (INSERTED PARTS)]


CD302
W826
W840
W210
W209
W208
R5525
R5526
W207
W236
C352
IC352
W203
C354
W202
W200
W201
W198
HS352
W903
R350
C350
C357
C309
C314
W305
C355
C311
C301
B301
C337
D302
L301
D301
IC301
W304
W303
R310
R309
C315
C312
W390
L302
W230
W229
W228
W227
W225
CD601_1
W220
W222
W221
D605
R627
W214
L614
CP604
VR6001_1
S817X_1
S817Y
S824X_1
S824Y
C832
D613
L616
C665_1
L618
L607
D607
D610
C824
C820
R674
CF604
S818X
L613
R704_1
Q612
L602
W306
W340
S811Y
CF601
W268
W322
C668_1
C674_1
W319
C635
L605
L615
W813
W316
W317
S820X
D609
D608
D612
C685
C659
W876
D615
D614
C664
CD850
W825
W804
W855_1
S102Y
W362
CP4001
C4089
W160
L4001
C4011
L5505
C5550
W844
C5549
C5548
C5547
C5539
C5537
C5533
C5532
C5529
C5527
C5535
C5528
C5518
R5501
W156
CP4003
W157
CP4202
CC4202
TP4001
TP5501
TP1002
TP5502
W355
W075
W345
Q1013
C5552
C5516
TP1001
W073
C916
C903
L901
C307
L902
L903
W004
CY901
SW1001
W953
W948
C5509
C5510
C5512
L5502
W843
C4071
W099
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W005
W004
W003
W002
W001
L5503
L5501
C5523
C5531
L5504
C5534
C5536
X4001
R4074
W092
W831
L4010
C4026
C4031
C4023
C4033
C4037
L4002
C4075
W348
R4079
W080
W079
B4002
R4061
W125
D1011
D1010
W334
W122
W121
W117
W913
R1016
W119
W116
W010
W113
W112
W021
L1001
R1058
W017
W018
W102
D1002
X1001
D1009
X1002
IC1002
Q1005
C1023
R1040
W053
W052
W051
C1058
C1003_1
W050
W049
W048
W814
C1053
W044
D1012
W046
W045
W043
R1047
W042
W041
W040
R1009
R1013
W039
W038
W837
W127
W126
W129
W138
W137
W135
W133
W132
W131
W130
W128
C1032
R1079
Q1009
Q1013
W087
W063
W062
W061
R1042
R1046
W347
R1039
D1014
C1056
W064
W059
W875
R1024
B1001
C1015
S807Y
C1016
C1018
C1020
R1010
CP1004
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W142
W144
W141
W140
W136
W134
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W238
W358
R610
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D617
D618
D616
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W825
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W293
W292
W291
W289
W851
W196
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D1005
D1004
D4204
R1005
CP1006
IC1003
C1001
R4068
R4067
W197
W195
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W150
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W147
W148
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W161
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C4035
C4008
C4005
C4024
Q4003
CP4002
Q4001
B4005
C4036
C4009
W265
W267
W266
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W359
W258
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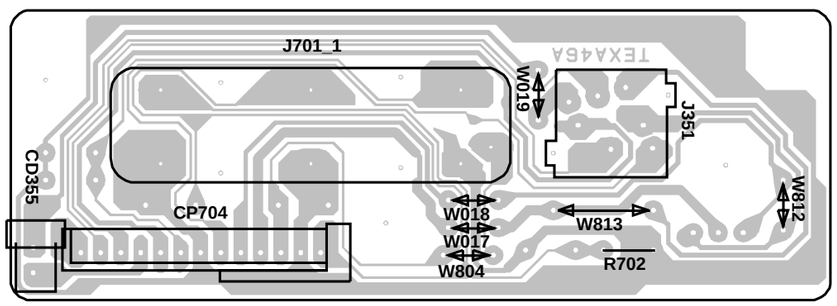
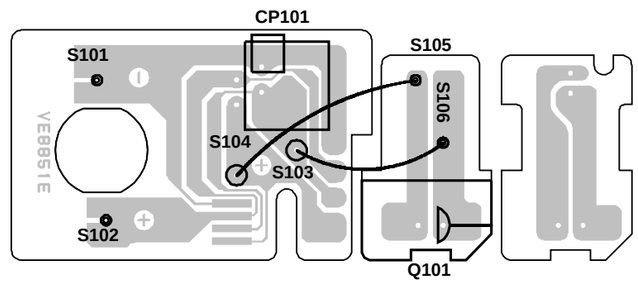
W257
W261
W178
W181
W177

TV-20F242

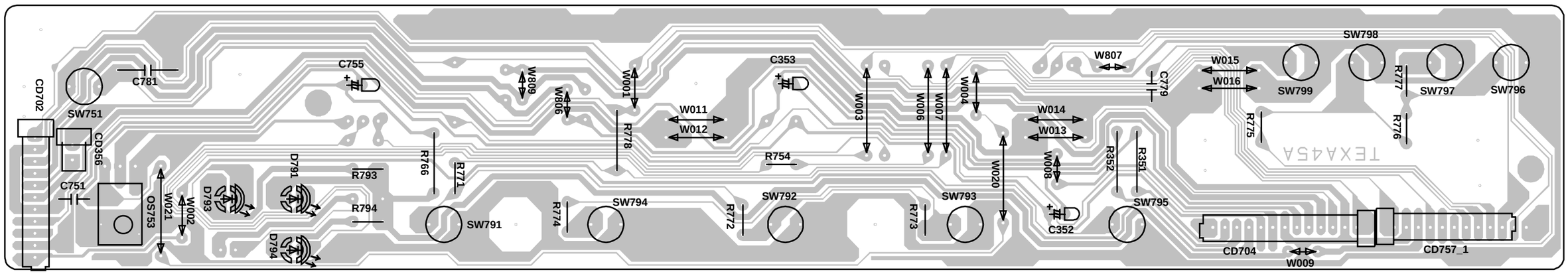
[AV PCB PATTERN]



[DECK PCB PATTERN]

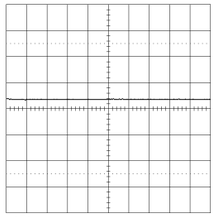


[OPERATION PCB PATTERN]



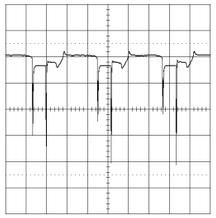
WAVEFORMS

TV POWER

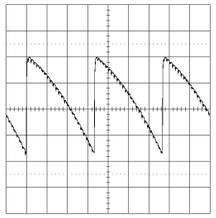


① 5V 0.1ms/div

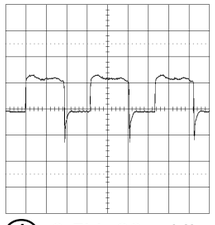
DEFLECTION



② 5V 20 s/div

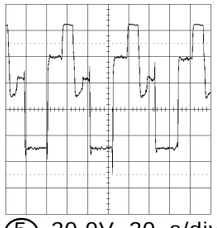


③ 0.5V 5ms/div

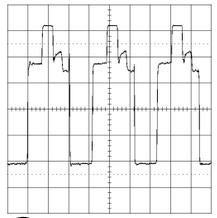


④ 0.5V 20 s/div

CRT



⑤ 20.0V 20 s/div



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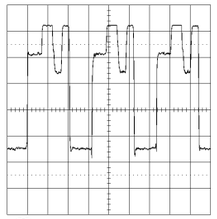
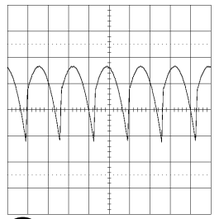


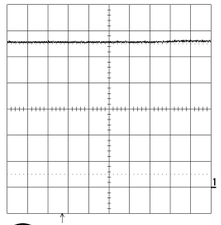
⑦ 20.0V 20 s/div

DEFLECTION

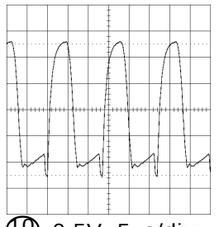


⑧ 1V 10ms/div

TV POWER

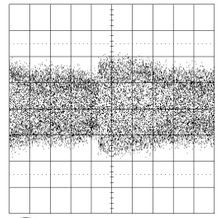


⑨ 20V 1ms/div

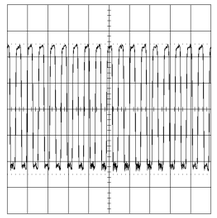


⑩ 0.5V 5 s/div

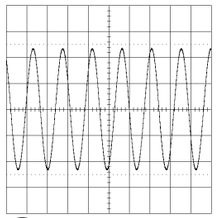
Y/C/AUDIO/HEAD AMP



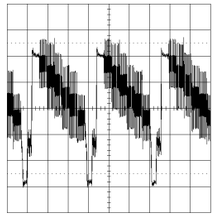
⑪ PB
100mV 5ms/div



⑫ REC/PB
100mV 0.5 s/div

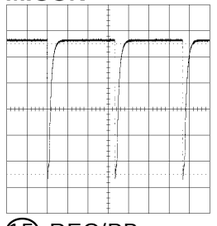


⑬ REC
20V 10 s/div

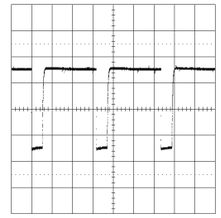


⑭ REC/PB
0.5V 20 s/div

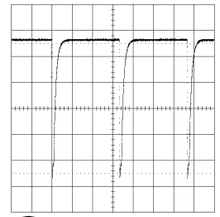
MICON



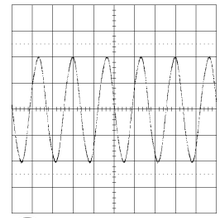
⑮ REC/PB
1V 5ms/div



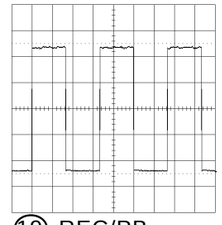
⑯ REC/PB
2V 20 s/div



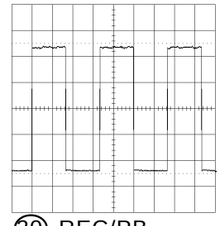
⑰ REC/PB
1V 5ms/div



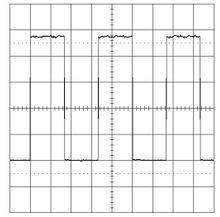
⑱ REC/PB
1V 50ns/div



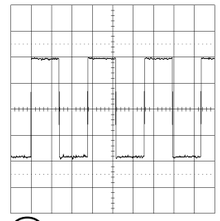
⑲ REC/PB
1V 10ms/div



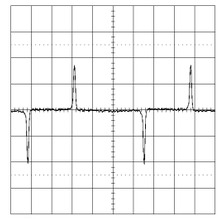
⑳ REC/PB
1V 10ms/div



㉑ REC/PB
1V 10ms/div

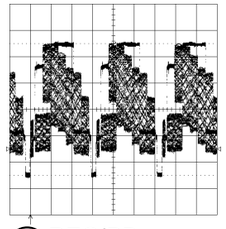


㉒ REC/PB
1V 0.5ms/div

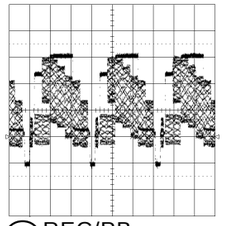


㉓ PB
1V 2ms/div

IN/OUT

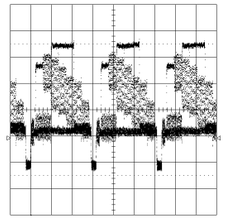


㉔ REC/PB
200mV 20ns/div

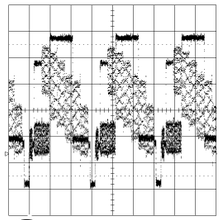


㉕ REC/PB
0.5V 20 s/div

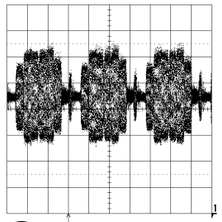
CHROMA/IF



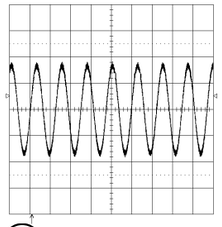
㉖ 200mV 20 s/div



㉗ 200mV 20 s/div

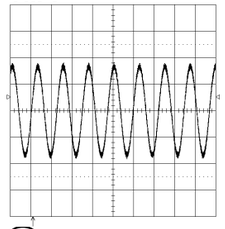


㉘ 200mV 20 s/div



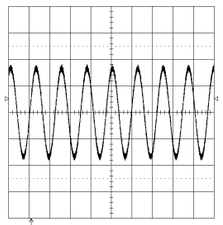
㉙ 200mV 20ms/div

HIFI



㉞ 200mV 2ms/div

NOTE: The following waveforms were measured at the point of the corresponding balloon number in the schematic diagram.



35 200mV 2ms/div

NOTE: The following waveforms were measured at the point of the corresponding balloon number in the schematic diagram.

PARTS LIST

CAUTION

- The parts identified by the ⚠ symbol are important for the safety . Whenever replacing these parts, be sure to use specified ones to secure the safety .
- The parts not indicated in this Parts List and those which are filled with lines --- in the Parts No. columns will not be supplied .
- P. W. Board Ass'y will not be supplied, but those which are filled with the Parts No. in the Parts No. columns will be supplied .

ABBREVIATIONS OF RESISTORS, CAPACITORS

RESISTOR

RC.....	CARBON RESISTOR

CAPACITORS

CC.....	CERAMIC CAPACITOR
CE.....	ALUMI ELECTROLYTIC CAPACITOR
CP.....	POLYESTER CAPACITOR
CPP.....	POLYPROPYLENE CAPACITOR
CPL.....	PLASTIC CAPACITOR
CMP.....	METAL POLYESTER CAPACITOR
CMPL.....	METAL PLASTIC CAPACITOR
CMPP.....	METAL POLYPROPYLENE CAPACITOR

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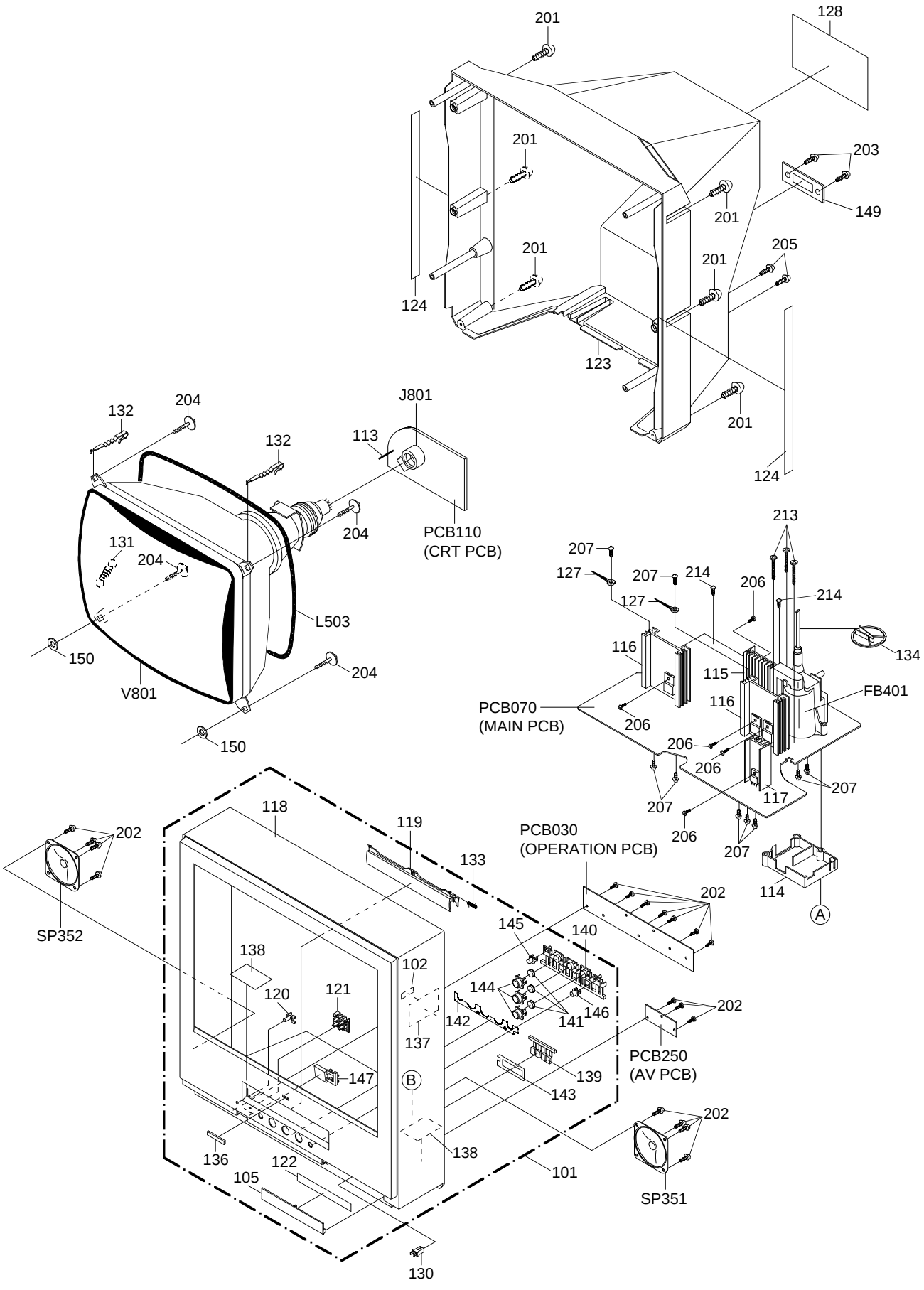
USING P.W. BOARD

Model / P.W.B ASS'Y	TV-20F242
SYSCON PCB ASSíY	X-A57202B01A
OPERATION PCB ASSíY	X-A57202B030
MAIN PCB ASSíY	X-A57202B07A
CRT PCB ASSíY	X-A57202B110
DIGITAL COMB FILTER ASSíY	X-A57202B30A
AV PCB ASSíY	X-A57202B250
DECK PCB ASSíY	X-A4C831B550

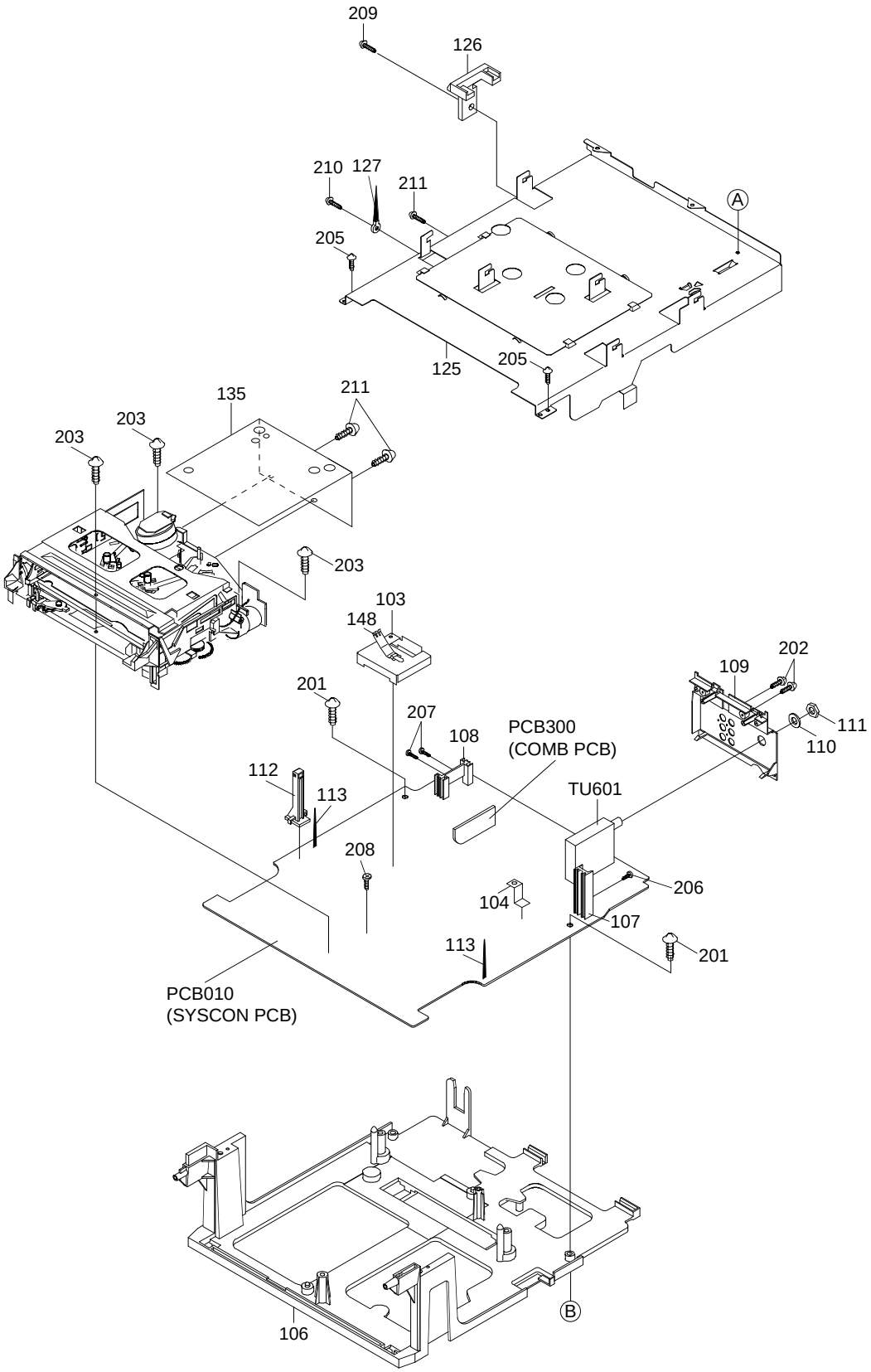
MECHANICAL REPLACEMENT PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	REF. NO.	PART NO.	DESCRIPTION
101	X-A57202B720	CABINET,FRONT ASS'Y	201	X-8117540B04	SCREW,TAPPING(B0) TRUSS 4x20
102	X-7220001107	SHEET,HWC	202	X-8110630A04	SCREW,TAP TITE(P) BRAZIER 3x10
103	X-752WSA0209	SHIELD,CASE HEAD AMP	203	X-8117140A24	SCREW,TAPPING(B0) PAN 4x12
104	X-753WSA0118	PLATE,EARTH-SYSCON	204	X-8111J50D04	SCREW,TAPPING(A) GW22 5x40
105	X-712WPB0050	DOOR	205	X-8110630A24	SCREW,TAP TITE(P) BRAZIER 3x12
106	X-761WPA0198	HOLDER,DECK	206	X-8109I30A04	SCREW,TAP TITE(B) WH7 3x10
107	X-763WAE0128	HEAT SINK	207	X-8109630802	SCREW,TAP TITE(B) BRAZIER 3x8
108	X-763WAA0160	HEAT SINK	208	X-8110330804	SCREW,TAP TITE(P) FLAT 3x8
109	X-771WPA0256	PLATE,JACK	209	X-8107630804	SCREW,TAP TITE(S) BRAZIER 3x8
110	X-82A97A4077	WASHER 9.7x14xT0.7	210	X-8107630604	SCREW,TAP TITE(S) BRAZIER 3x6
111	X-8300495207	NUT (VOLUME NUT 3/8 INCH)	211	X-8107226604	SCREW,TAP TITE(S) BIND 2.6x6
112	X-85OP700036	HOLDER,EOT SENSOR	213	X-810A130B04	SCREW/WASHER(A) M3x20
113	X-8990TPA002	COATING CLIP	214	X-810A130604	SCREW/WASHER(A) M3x6
114	X-761WPA0145	HOLDER,FBT			
115	X-763WAA0159	HEAT SINK			
116	X-763WAA0158	HEAT SINK			
117	X-763WAE0118	HEAT SINK			
119	X-712WPJ0721	FLAP			
120	X-713WPA0129	GUIDE,REMOCON			
121	X-713WPA0137	GLASS,LED			
122	X-7230007181	SHEET,INDICATER			
123	X-702WPA0750	CABINET,BACK			
124	X-800WQ00066	FELT SHEET			
125	X-752WSAA026	PLATE,DECK SHIELD ASS'Y			
126	X-761WPA0151	HOLDER,M/PCB			
127	X-8995034000	CORD CLIP UL CO.			
128	X-7225380005	SHEET,RATING			
130	X-890LA20000	NC LATCH(LA-2)			
131	X-741WUA0001	SPRING,EARTH			
132	X-762WPA0011	HOLDER,CRT WIRE			
133	X-743WKA0032	SPRING,FLAP			
134	X-899HV3T000	HOLDER,ANODE WIRE			
135	X-752WSAA027	SHIELD,COVER DECK			
136	X-7235380002	BADGE,BRAND			
137	X-7220001119	SHEET,CSA WARNING			
138	X-7260000322	SHEET,CRT SERVICEMAN			
139	X-735WPA0521	BUTTON,CHANNEL			
140	X-735WPD0725	BUTTON,FRAME			
141	X-735WPA0516	BUTTON,CLEAR			
142	X-753WSA0135	PLATE,EARTH1			
143	X-753WSA0136	PLATE,EARTH2			
144	X-735WPE0011	BUTTON,COVER			
145	X-735WPE0012	BUTTON,CAP(STOP)			
146	X-735WPE0013	BUTTON,CAP(REC)			
147	X-735WPJ0171	BUTTON,POWER			
148	X-753WUAA006	SPRING,EARTH HEAD AMP			
149	X-761WPA0210	HOLDER,BELT			
150	X-769WSA0007	WASHER CRT T=1			

MECHANICAL EXPLODED VIEW (1/2)



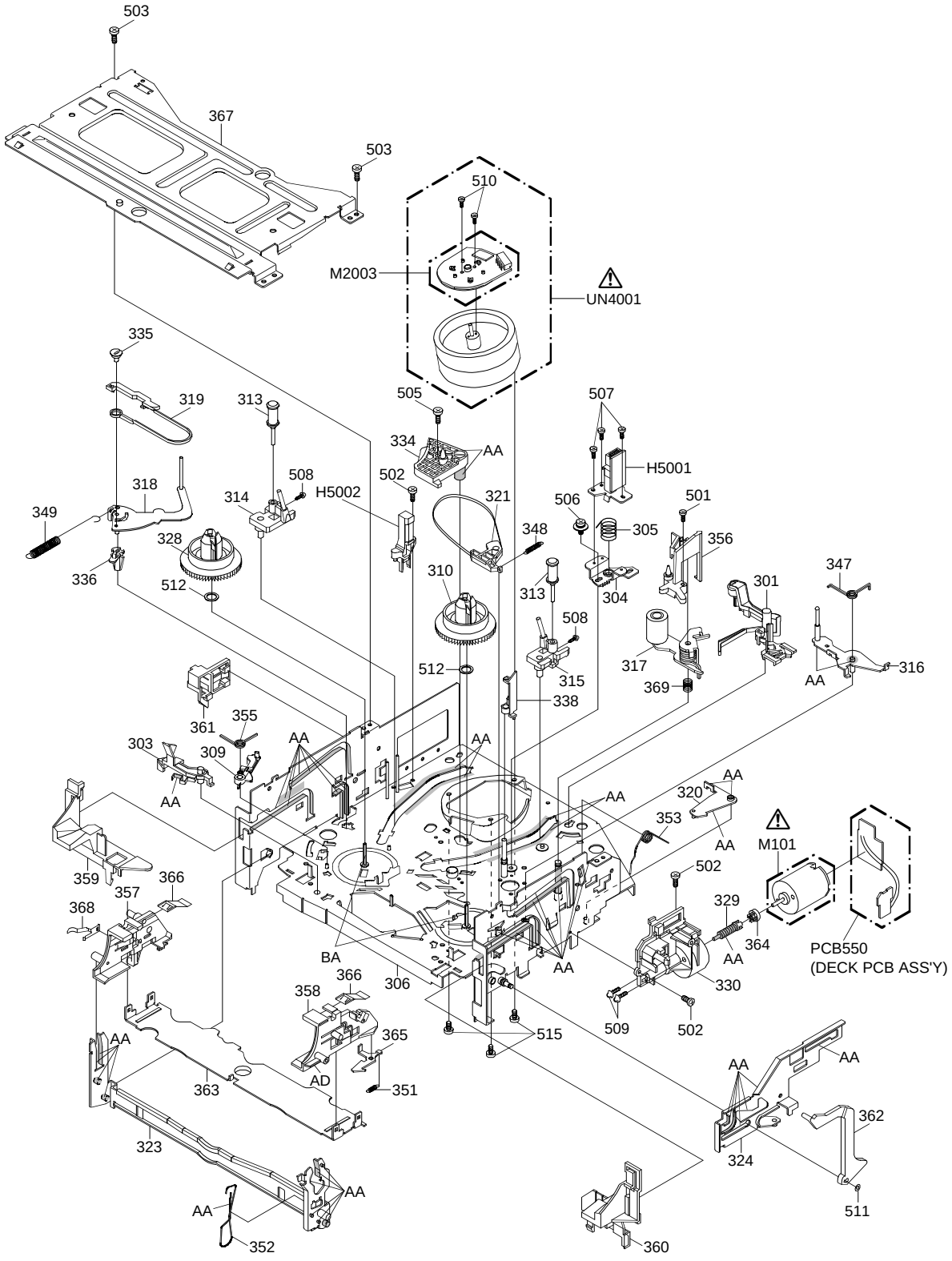
MECHANICAL EXPLODED VIEW (2/2)



CHASSIS REPLACEMENT PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	REF. NO.	PART NO.	DESCRIPTION	
301	X-85OA500022	AHC ASS'Y	501	X-8107126A04	SCREW,TAP TITE(S) PAN	2.6x10
302	X-85OP200290	BELT,CAPSTAN (S)	502	X-8107226804	SCREW,TAP TITE(S) BIND	2.6x8
303	X-85OP900710	LEVER,REC	503	X-8107226604	SCREW,TAP TITE(S) BIND	2.6x6
304	X-85OP500083	BASE,AC HEAD	504	X-8109126604	SCREW,TAP TITE(B) PAN	2.6x6
305	X-85OP800324	SPRING,AC HEAD	505	X-810A126804	SCREW/WASHER(A)	M2.6x8
306	X-85OA000367	MAIN CHASSIS ASS'Y (S-Z)	506	X-810B126404	SCREW/WASHER(B)	M2.6x4
307	X-85OA200082	CLUTCH ASS'Y(S2)	507	X-8102120604	SCREW,PAN	M2x6
308	X-85OA200080	ARM,IDLER ASS'Y (S)	508	X-8102120304	SCREW,PAN	M2x3
309	X-85OP600556	ARM,SS BRAKE (S)	509	X-8102130304	SCREW,PAN	M3.0x3.0
310	X-85OP200292	REEL,T (S)	510	X-810A123504	SEMS A	M2.3x5.0
311	X-85OA300061	LOADING ARM S ASS'Y	511	X-82P266005N	POLYSLIDER WASHER(CUT)	2.6x6.0xT0.5
312	X-85OA300062	LOADING ARM T ASS'Y	512	X-82Q2647C5N	POLYSLIDER WASHER	2.6x4.7xT0.25
313	X-85OA400210	GUIDE ROLLER ASS'Y	513	X-82P184505N	POLYSLIDER WASHER(CUT)	1.8x4.5xT0.5
314	X-85OA400188	BASE,INCL S ASS'Y	514	X-83ETW30000	E-RING	3.0
315	X-85OA400196	BASE,INCL T(S) ASS'Y	515	X-810A126504	SCREW/WASHER(A)	M2.6x5
316	X-85OA400199	P5-3 ARM ASS'Y(S)				
317	X-85OA400205	PINCH ROLLER BLOCK	CP101	X-069R740018	CONNECTOR PCB SIDE	52044-0445
318	X-85OA400175	TENSION ARM ASS'Y	H5001	X-1523D91034	HEAD (AUDIO CONTROL)	HVMXA1072A
319	X-85OA400184	TENSION BAND ASS'Y (S)	H5002	X-1543D02013	HEAD (FULL ERASE)	HVFHP0032A
			⚠ M101	X-1596P78001	MOTOR (LOADING)	MXN13FB11H
320	X-85OA400178	PINCH ROLLER LEVER ASS'Y	⚠ M2001	X-1510398032	CAPSTAN DD UNIT	F2QSB06
321	X-85OA600196	BRAKE T ASSY(S)	M2003	X-1589V11007	MICRO MOTOR	EP14BD
322	X-85OA600191	CAP BRAKE ASS'Y(S)	PCB550	X-A4C831B550	DECK PCB ASS'Y	VE8851
323	X-85OA900213	LINK ASS'Y	Q101	X-0000700320	TRANSISTOR,PHOTO	RPT-38PB113
324	X-85OA900216	LINK LEVER ASS'Y	⚠ UN4001	X-A57201B500	CYLINDER UNIT ASSY	A57201B500
325	X-85OP200284	LEVER,CLUTCH (S)				
326	X-85OP200285	ACTUATOR,CLUTCH				
327	X-85OP200298	GEAR,COUPLING(S2)				
328	X-85OP200291	REEL,S (S)				
329	X-85OP600541	WORM				
330	X-85OP600563	BRACKET,MOTOR				
331	X-85OP300178	GEAR,MAIN LOADING				
332	X-85OP300179	GEAR,LOADING S				
333	X-85OP300180	GEAR,LOADING T				
334	X-85OP300187	HOLDER,LOADING GEAR (S-Z)				
335	X-85OP400472	ADJUST,TENSION				
336	X-85OP400492	HOLDER,TENSION				
337	X-85OP400490	LEVER,TENSION				
338	X-85OP400475	COVER,P4				
339	X-85OP600543	GEAR,JOINT				
340	X-85OP600544	GEAR,MIDDLE				
341	X-85OP600554	CAM,MAIN (S)				
342	X-85OP600546	CAM,P5				
343	X-85OP600565	CAM,PINCH ROLLER				
344	X-85OP600561	ROD,MAIN(S)				
345	X-85OP700035	REFLECTOR,LED				
346	X-85OP800318	SPRING,LOADING GEAR				
347	X-85OP800334	SPRING,P5 (S)				
348	X-85OP800335	SPRING,BRAKE T (S)				
349	X-85OP800322	SPRING,TENSION				
350	X-85OP800336	SPRING,CAP BRAKE (S)				
351	X-85OP800342	SPRING,LOCKER (S)				
352	X-85OP800326	SPRING,LINK				
353	X-85OP800328	SPRING,DAMPER				
354	X-85OP800330	SPRING,RING				
355	X-85OP800337	SPRING,SS BRAKE (S)				
356	X-85OP900680	OPENER,CASS				
357	X-85OP900731	CASS SIDE L				
358	X-85OP900732	CASS SIDE R				
359	X-85OP900728	TAPE GUIDE L(P,R)				
360	X-85OP900729	TAPE GUIDE R				
361	X-85OP900714	COVER,SENSOR L3				
362	X-85OP900688	LEVER,FLAP				
363	X-85OP900690	CASS HOLDER				
364	X-85OP600540	DRIVER,WORM				
365	X-85OP900713	LOCKER,R2				
366	X-85OP900694	SPRING,PACK				
367	X-85OP900695	BRACKET,TOP				
368	X-85OP900696	SPRING,CASS EARTH				
369	X-85OP800341	SPRING,P/R ARM				

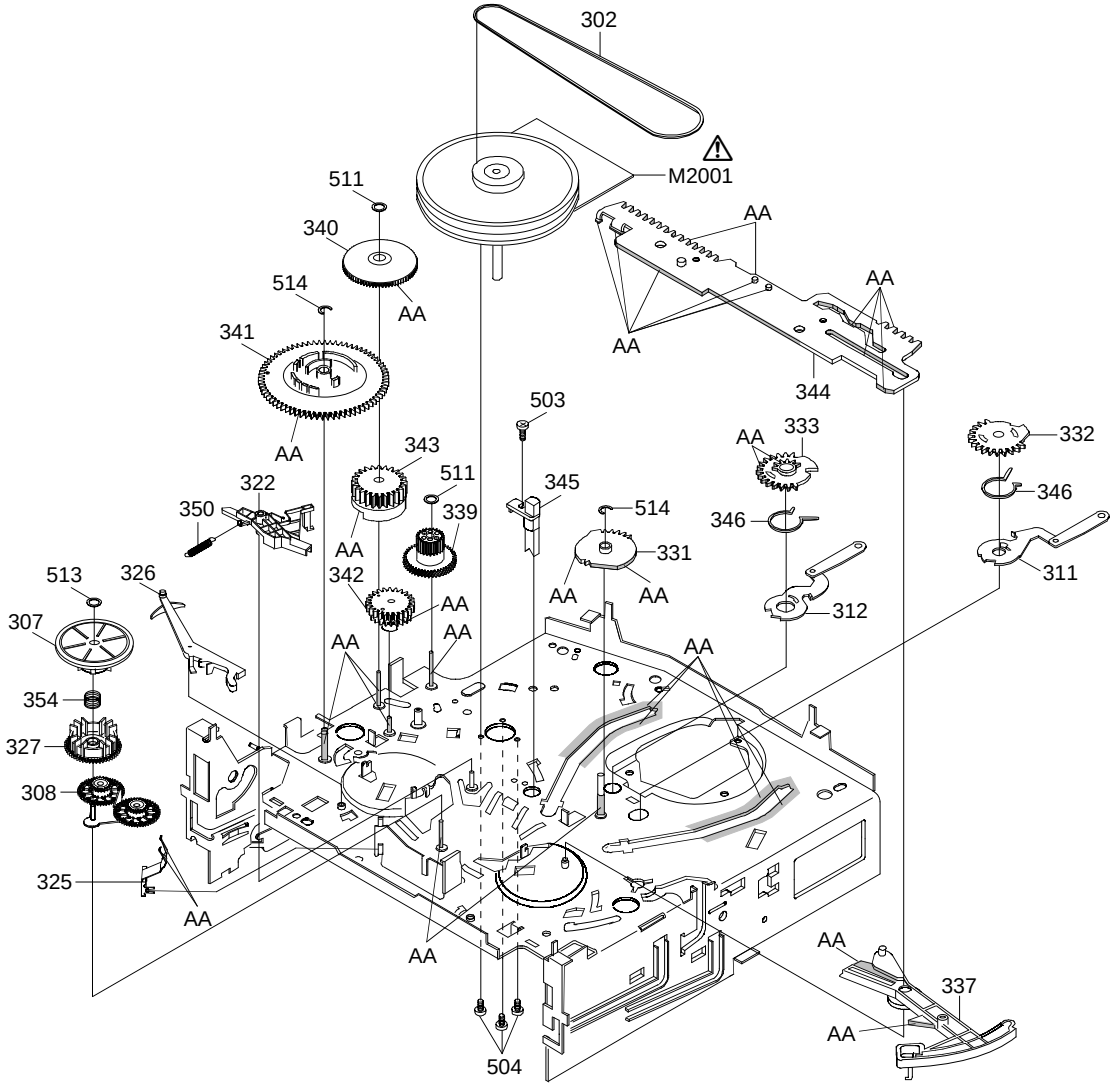
CHASSIS EXPLODED VIEW (TOP VIEW)



CLASS	PART NO.	MARK
GREASE	G-555G	AA
	G-488M	AB
	FL-721	AC
	MG-33	AD
OIL	FL OIL No. 6115	BA

NOTE: Applying positions AA, AB, AC, AD and BA for the grease or oil are displayed for this section. Check if the correct grease or oil is applied for each position.

CHASSIS EXPLODED VIEW (BOTTOM VIEW)



CLASS	PART NO.	MARK
GREASE	G-555G	AA
	G-488M	AB
	FL-721	AC
	MG-33	AD
OIL	FL OIL No. 6115	BA

NOTE: Applying positions AA, AB, AC, AD and BA for the grease or oil are displayed for this section. Check if the correct grease or oil is applied for each position.

ELECTRICAL REPLACEMENT PARTS LIST

REF. NO.	PART NO.	DESCRIPTION		REF. NO.	PART NO.	DESCRIPTION	
		RESISTORS				**RESISTORS**	
R302	X-R801R7332J	RC	3.3K OHM 1/10W	R509	X-R002T4103J	RC	10K OHM 1/4W
R303	X-R801R7272J	RC	2.7K OHM 1/10W	R511	X-R002T4102J	RC	1K OHM 1/4W
R304	X-R801R7472J	RC	4.7K OHM 1/10W	⚠ R512	X-R3X28A103J	R,METAL OXIDE	10K OHM 2W
R305	X-R801R7472J	RC	4.7K OHM 1/10W	R513	X-R002T4471J	RC	470 OHM 1/4W
R306	X-R801R7182J	RC	1.8K OHM 1/10W	R514	X-R002T4681J	RC	680 OHM 1/4W
R307	X-R801R7182J	RC	1.8K OHM 1/10W	R515	X-R002T4103J	RC	10K OHM 1/4W
R308	X-R801R7332J	RC	3.3K OHM 1/10W	R516	X-R002T4391J	RC	390 OHM 1/4W
R309	X-R002T4221J	RC	220 OHM 1/4W	R518	X-R002T4103J	RC	10K OHM 1/4W
R310	X-R002T4221J	RC	220 OHM 1/4W	R519	X-R002T4103J	RC	10K OHM 1/4W
R311	X-R801R7104J	RC	100K OHM 1/10W	R520	X-R002T4103J	RC	10K OHM 1/4W
R313	X-R801R7391J	RC	390 OHM 1/10W	R521	X-R002T4103J	RC	10K OHM 1/4W
R316	X-R801R7272J	RC	2.7K OHM 1/10W	R523	X-R002T4103J	RC	10K OHM 1/4W
R317	X-R801R7101J	RC	100 OHM 1/10W	R524	X-R002T4101J	RC	100 OHM 1/4W
R318	X-R801R7101J	RC	100 OHM 1/10W	⚠ R528	X-R3X28B223J	R,METAL	22K OHM 3W
R350	X-R002T4104J	RC	100K OHM 1/4W	⚠ R529	X-R4X5T4272F	R,METAL	2.7K OHM 1/4W
				R532	X-R002T4123J	RC	12K OHM 1/4W
R352	X-R002T2221J	RC	220 OHM 1/2W	R533	X-R002T4622J	RC	6.2K OHM 1/4W
R353	X-R903N8683J	RC	68K OHM 1/8W	⚠ R542	X-R33681R13J	R,METAL	0.13OHM 1W
R359	X-R903N8473J	RC	47K OHM 1/8W	⚠ R543	X-R63584681J	R,FUSE	680 OHM 1/4W
R401	X-R002T4223J	RC	22K OHM 1/4W	R552	X-R002T4103J	RC	10K OHM 1/4W
⚠ R402	X-R3X18AR47J	R,METAL OXIDE	0.47 OHM 2W	R553	X-R002T2393J	RC	39K OHM 1/2W
R409	X-R002T4473J	RC	47K OHM 1/4W	R554	X-R002T2223J	RC	22K OHM 1/2W
R410	X-R002T4562J	RC	5.6K OHM 1/4W	R601	X-R903N8222J	RC	2.2K OHM 1/8W
R411	X-R4X5T6123F	R,METAL	12K OHM 1/6W	R602	X-R002T4221J	RC	220 OHM 1/4W
R412	X-R002T4471J	RC	470 OHM 1/4W	R603	X-R002T4221J	RC	220 OHM 1/4W
R413	X-R4X5T6273F	R,METAL	27K OHM 1/6W	R605	X-R903N8223J	RC	22K OHM 1/8W
⚠ R415	X-R002T21R8J	RC	1.8 OHM 1/2W	R607	X-R002T2221J	RC	220 OHM 1/2W
R416	X-R4X5T6472F	R,METAL	4.7K OHM 1/6W	R608	X-R903N8103J	RC	10K OHM 1/8W
R417	X-R002T2391J	RC	390 OHM 1/2W	R609	X-R903N8331J	RC	330 OHM 1/8W
⚠ R418	X-R002T22R2J	RC	2.2 OHM 1/2W	R610	X-R002T4101J	RC	100 OHM 1/4W
R419	X-R002T2391J	RC	390 OHM 1/2W	R611	X-R903N8103J	RC	10K OHM 1/8W
R421	X-R002T2102J	RC	1K OHM 1/2W	R614	X-R903N8184J	RC	180K OHM 1/8W
R422	X-R002T4103J	RC	10K OHM 1/4W	R616	X-R903N8221J	RC	220 OHM 1/8W
R423	X-R002T4103J	RC	10K OHM 1/4W	R618	X-R801R7106J	RC	10M OHM 1/10W
R424	X-R002T4103J	RC	10K OHM 1/4W	R620	X-R801R7123J	RC	12K OHM 1/10W
R428	X-R002T4223J	RC	22K OHM 1/4W	R621	X-R903N8102J	RC	1K OHM 1/8W
R429	X-R002T4272J	RC	2.7K OHM 1/4W	R622	X-R903N8471J	RC	470 OHM 1/8W
R431	X-R002T4332J	RC	3.3K OHM 1/4W	R624	X-R903N8202J	RC	2K OHM 1/8W
R432	X-R002T2222J	RC	2.2K OHM 1/2W	R625	X-R903N8103J	RC	10K OHM 1/8W
R433	X-R002T4272J	RC	2.7K OHM 1/4W	R626	X-R903N8103J	RC	10K OHM 1/8W
R434	X-R002T2152J	RC	1.5K OHM 1/2W	R627	X-R002T4103J	RC	10K OHM 1/4W
R435	X-R002T2821J	RC	820 OHM 1/2W	R628	X-R903N8682J	RC	6.8K OHM 1/8W
⚠ R436	X-R65582120J	R,FUSE	12 OHM 1/2W	R629	X-R903N8222J	RC	2.2K OHM 1/8W
⚠ R437	X-R3X181010J	R,METAL OXIDE	1 OHM 1W	R630	X-R903N8101J	RC	100 OHM 1/8W
R438	X-R002T4822J	RC	8.2K OHM 1/4W	R631	X-R903N8682J	RC	6.8K OHM 1/8W
⚠ R439	X-R4X5T4223F	R,METAL	22K OHM 1/4W	R632	X-R903N8680J	RC	68 OHM 1/8W
⚠ R441	X-R4X5T4104F	R,METAL	100K OHM 1/4W	R633	X-R903N8822J	RC	8.2K OHM 1/8W
⚠ R442	X-R4X5T4472F	R,METAL	4.7K OHM 1/4W	R634	X-R903N8101J	RC	100 OHM 1/8W
⚠ R443	X-R4X5T4332F	R,METAL	3.3K OHM 1/4W	R635	X-R903N8101J	RC	100 OHM 1/8W
⚠ R444	X-R4X5T4123F	R,METAL	12K OHM 1/4W	R636	X-R903N8101J	RC	100 OHM 1/8W
R445	X-R002T4473J	RC	47K OHM 1/4W	R638	X-R903N8682J	RC	6.8K OHM 1/8W
R446	X-R002T4223J	RC	22K OHM 1/4W	R641	X-R903N8273J	RC	27K OHM 1/8W
⚠ R447	X-R65582680J	R,FUSE	68 OHM 1/2W	R642	X-R903N8682J	RC	6.8K OHM 1/8W
⚠ R448	X-R3K181102J	R'METAL	1K OHM 1W	R643	X-R903N8473J	RC	47K OHM 1/8W
⚠ R449	X-R5W2CE272J	R,CEMENT	2.7K OHM 7W	R644	X-R002T4101J	RC	100 OHM 1/4W
⚠ R450	X-R3X181R68J	R,METAL OXIDE	0.68 OHM 1W	R646	X-R903N8153J	RC	15K OHM 1/8W
R451	X-R002T4224J	RC	220K OHM 1/4W	R647	X-R903N8222J	RC	2.2K OHM 1/8W
⚠ R452	X-R3X1812R2J	R,METAL OXIDE	2.2 OHM 1W	R648	X-R903N8222J	RC	2.2K OHM 1/8W
R453	X-R002T4683J	RC	68K OHM 1/4W	R649	X-R903N8222J	RC	2.2K OHM 1/8W
R454	X-R002T4472J	RC	4.7K OHM 1/4W	R652	X-R903N8472J	RC	4.7K OHM 1/8W
R456	X-R002T2472J	RC	4.7K OHM 1/2W	R655	X-R903N8101J	RC	100 OHM 1/8W
R457	X-R002T4911J	RC	910 OHM 1/4W	R656	X-R903N8222J	RC	2.2K OHM 1/8W
R458	X-R002T4333J	RC	33K OHM 1/4W	R657	X-R903N8102J	RC	1K OHM 1/8W
R459	X-R002T4273J	RC	27K OHM 1/4W	R658	X-R903N8222J	RC	2.2K OHM 1/8W
R460	X-R002T4101J	RC	100 OHM 1/4W	R659	X-R903N8222J	RC	2.2K OHM 1/8W
R461	X-R001T4562J	RC	5.6K OHM 1/4W	R660	X-R903N8222J	RC	2.2K OHM 1/8W
R469	X-R4X5T6682F	R,METAL	6.8K OHM 1/6W	R662	X-R903N8101J	RC	100 OHM 1/8W
R490	X-R002T4223J	RC	22K OHM 1/4W	R663	X-R903N8101J	RC	100 OHM 1/8W
⚠ R500	X-R21202275K	R,SOLID	2.7M OHM 1/2W	R665	X-R903N8561J	RC	560 OHM 1/8W
⚠ R501	X-R5W2CE2R2J	R,CEMENT	2.2 OHM 7W	R667	X-R903N8102J	RC	1K OHM 1/8W
R502	X-R002T2100J	RC	10 OHM 1/2W	R668	X-R002T4101J	RC	100 OHM 1/4W
⚠ R503	X-R002T4332J	RC	3.3K OHM 1/4W	R669	X-R002T4821J	RC	820 OHM 1/4W
R504	X-R002T2124J	RC	120K OHM 1/2W	R670	X-R801R7101J	RC	100 OHM 1/10W
R505	X-R801R7101J	RC	100 OHM 1/10W	R671	X-R801R7221J	RC	220 OHM 1/10W
R506	X-R002T4222J	RC	2.2K OHM 1/4W	R672	X-R903N8471J	RC	470 OHM 1/8W
R507	X-R002T4102J	RC	1K OHM 1/4W	R673	X-R801R7154J	RC	150K OHM 1/10W
R508	X-R002T4105J	RC	1M OHM 1/4W	R674	X-R002T2470J	RC	47 OHM 1/2W

ELECTRICAL REPLACEMENT PARTS LIST

REF. NO.	PART NO.	DESCRIPTION		REF. NO.	PART NO.	DESCRIPTION	
		RESISTORS				**RESISTORS**	
R677	X-R801R7335J	RC	3.3M OHM 1/10W	R1034	R903N8564J	RC	560K OHM 1/8W
R680	X-R801R7562J	RC	5.6K OHM 1/10W	R1035	R801R7330J	RC	33 OHM 1/10W
R681	X-R801R7102J	RC	1K OHM 1/10W	R1036	R801R7472J	RC	4.7K OHM 1/10W
R683	X-R801R7222J	RC	2.2K OHM 1/10W	R1038	R903N8100J	RC	10 OHM 1/8W
R684	X-R002T4222J	RC	2.2K OHM 1/4W	R1039	R002T4183J	RC	18K OHM 1/4W
R685	X-R002T4222J	RC	2.2K OHM 1/4W	R1040	R002T4333J	RC	33K OHM 1/4W
R702	X-R002T4750J	RC	75 OHM 1/4W	R1042	R002T4102J	RC	1K OHM 1/4W
R704	X-R002T4271J	RC	270 OHM 1/4W	R1044	R903N8332J	RC	3.3K OHM 1/8W
R754	X-R002T4271J	RC	270 OHM 1/4W	R1045	R903N8332J	RC	3.3K OHM 1/8W
R766	X-R002T2101J	RC	100 OHM 1/2W	R1046	R002T4472J	RC	4.7K OHM 1/4W
R771	X-R002T4102J	RC	1K OHM 1/4W	R1047	R002T4472J	RC	4.7K OHM 1/4W
R772	X-R002T4152J	RC	1.5K OHM 1/4W	R1048	R002T4102J	RC	1K OHM 1/4W
R773	X-R002T4272J	RC	2.7K OHM 1/4W	R1049	R903N8472J	RC	4.7K OHM 1/8W
R774	X-R002T4562J	RC	5.6K OHM 1/4W	R1050	R903N8101J	RC	100 OHM 1/8W
R775	X-R002T4821J	RC	820 OHM 1/4W	R1051	R903N8562J	RC	5.6K OHM 1/8W
R776	X-R002T4102J	RC	1K OHM 1/4W	R1053	R903N8221J	RC	220 OHM 1/8W
R777	X-R002T4152J	RC	1.5K OHM 1/4W	R1055	R903N8221J	RC	220 OHM 1/8W
R778	X-R002T4821J	RC	820 OHM 1/4W	R1056	R903N8221J	RC	220 OHM 1/8W
R793	X-R002T4271J	RC	270 OHM 1/4W	R1058	R001T6272J	RC	2.7K OHM 1/6W
R794	X-R002T4271J	RC	270 OHM 1/4W	R1059	R801R7472J	RC	4.7K OHM 1/10W
⚠ R804	X-R3X18A123J	R,METAL OXIDE	12K OHM 2W	R1066	R903N8102J	RC	1K OHM 1/8W
R805	X-R002T4560J	RC	56 OHM 1/4W	R1077	R903N8102J	RC	1K OHM 1/8W
⚠ R806	X-R3X18A123J	R,METAL OXIDE	12K OHM 2W	R1078	R801R7334J	RC	330K OHM 1/10W
R807	X-R002T4560J	RC	56 OHM 1/4W	R1079	R002T4220J	RC	22 OHM 1/4W
⚠ R808	X-R3X18A123J	R,METAL OXIDE	12K OHM 2W	R1083	R903N8223J	RC	22K OHM 1/8W
R809	X-R002T4560J	RC	56 OHM 1/4W	R1087	R903N8223J	RC	22K OHM 1/8W
R810	X-R002T4182J	RC	1.8K OHM 1/4W	R4001	R903N8821J	RC	820 OHM 1/8W
R811	X-R002T4182J	RC	1.8K OHM 1/4W	R4002	R903N8103J	RC	10K OHM 1/8W
R812	X-R002T4182J	RC	1.8K OHM 1/4W	R4003	R801R7103J	RC	10K OHM 1/10W
R813	X-R002T4221J	RC	220 OHM 1/4W	R4004	R801R7272J	RC	2.7K OHM 1/10W
R814	X-R002T4221J	RC	220 OHM 1/4W	R4005	R903N8152J	RC	1.5K OHM 1/8W
R815	X-R002T4221J	RC	220 OHM 1/4W	R4007	R903N8681J	RC	680 OHM 1/8W
R817	X-R002T4331J	RC	330 OHM 1/4W	R4008	R903N8103J	RC	10K OHM 1/8W
R819	X-R002T4331J	RC	330 OHM 1/4W	R4009	R903N8392J	RC	3.9K OHM 1/8W
R821	X-R002T4331J	RC	330 OHM 1/4W	R4010	R903N8332J	RC	3.3K OHM 1/8W
R828	X-R002T4272J	RC	2.7K OHM 1/4W	R4011	R903N8223J	RC	22K OHM 1/8W
R829	X-R002T4272J	RC	2.7K OHM 1/4W	R4012	R903N8183J	RC	18K OHM 1/8W
R830	X-R002T4272J	RC	2.7K OHM 1/4W	R4013	R903N8183J	RC	18K OHM 1/8W
R831	X-R002T2125J	RC	1.2M OHM 1/2W	R4014	R801R7182J	RC	1.8K OHM 1/10W
R902	X-R801R7102J	RC	1K OHM 1/10W	R4015	R002T42R2J	RC	2.2 OHM 1/4W
R904	X-R801R7471J	RC	470 OHM 1/10W	R4019	R903N8823J	RC	82K OHM 1/8W
R905	X-R801R7121J	RC	120 OHM 1/10W	R4020	R903N8103J	RC	10K OHM 1/8W
R906	X-R801R7102J	RC	1K OHM 1/10W	R4021	R801R7272J	RC	2.7K OHM 1/10W
R907	X-R801R7333J	RC	33K OHM 1/10W	R4022	R903N8682J	RC	6.8K OHM 1/8W
R908	X-R801R7821J	RC	820 OHM 1/10W	R4023	R903N8153J	RC	15K OHM 1/8W
R909	X-R801R7101J	RC	100 OHM 1/10W	R4024	R903N8103J	RC	10K OHM 1/8W
R910	X-R801R7102J	RC	1K OHM 1/10W	R4025	R903N8334J	RC	330K OHM 1/8W
R911	X-R801R7332J	RC	3.3K OHM 1/10W	R4026	R903N8333J	RC	33K OHM 1/8W
R912	X-R801R7682J	RC	6.8K OHM 1/10W	R4027	R903N8151J	RC	150 OHM 1/8W
R913	X-R801R7222J	RC	2.2K OHM 1/10W	R4029	R801R7225J	RC	2.2M OHM 1/10W
R914	X-R801R7821J	RC	820 OHM 1/10W	R4032	R801R7273J	RC	27K OHM 1/10W
R915	X-R801R7471J	RC	470 OHM 1/10W	R4033	R903N8102J	RC	1K OHM 1/8W
R1001	X-R903N8332J	RC	3.3K OHM 1/8W	R4034	R903N8821J	RC	820 OHM 1/8W
R1002	X-R002T4121J	RC	120 OHM 1/4W	R4039	R903N8333J	RC	33K OHM 1/8W
R1003	X-R903N8823J	RC	82K OHM 1/8W	R4041	R903N8682J	RC	6.8K OHM 1/8W
R1004	X-R903N8102J	RC	1K OHM 1/8W	R4044	R903N8822J	RC	8.2K OHM 1/8W
R1005	X-R615J12R7J	R,FUSE	2.7 OHM 1W	R4046	R903N8182J	RC	1.8K OHM 1/8W
R1006	X-R903N8473J	RC	47K OHM 1/8W	R4047	R903N8103J	RC	10K OHM 1/8W
R1007	X-R903N8330J	RC	33 OHM 1/8W	R4048	R903N8472J	RC	4.7K OHM 1/8W
R1008	X-R903N8102J	RC	1K OHM 1/8W	R4049	R903N8152J	RC	1.5K OHM 1/8W
R1009	X-R002T4561J	RC	560 OHM 1/4W	R4050	R903N8104J	RC	100K OHM 1/8W
R1010	X-R002T4332J	RC	3.3K OHM 1/4W	R4051	R903N8273J	RC	27K OHM 1/8W
R1011	X-R903N8222J	RC	2.2K OHM 1/8W	R4052	R002T4680J	RC	68 OHM 1/4W
R1012	X-R903N8103J	RC	10K OHM 1/8W	R4053	R801R7152J	RC	1.5K OHM 1/10W
R1013	X-R002T4561J	RC	560 OHM 1/4W	R4054	R801R7272J	RC	2.7K OHM 1/10W
R1016	X-R002T4271J	RC	270 OHM 1/4W	R4055	R903N8103J	RC	10K OHM 1/8W
R1017	X-R903N8333J	RC	33K OHM 1/8W	R4057	R903N8222J	RC	2.2K OHM 1/8W
R1018	X-R903N8472J	RC	4.7K OHM 1/8W	R4058	R002T4105J	RC	1M OHM 1/4W
R1019	X-R903N8473J	RC	47K OHM 1/8W	R4059	R801R7684J	RC	680K OHM 1/10W
R1020	X-R903N8223J	RC	22K OHM 1/8W	R4060	R903N8224J	RC	220K OHM 1/8W
R1021	X-R903N8330J	RC	33 OHM 1/8W	R4061	R002T4105J	RC	1M OHM 1/4W
R1024	X-R002T4102J	RC	1K OHM 1/4W	R4062	R903N8224J	RC	220K OHM 1/8W
R1028	X-R903N8472J	RC	4.7K OHM 1/8W	R4063	R801R7335J	RC	3.3M OHM 1/10W
R1029	X-R903N8472J	RC	4.7K OHM 1/8W	R4064	R903N8101J	RC	100 OHM 1/8W
R1031	X-R903N8102J	RC	1K OHM 1/8W	R4065	R903N8222J	RC	2.2K OHM 1/8W
R1032	R903N8103J	RC	10K OHM 1/8W	R4067	R002T4473J	RC	47K OHM 1/4W
R1033	R903N8122J	RC	1.2K OHM 1/8W				

ELECTRICAL REPLACEMENT PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	
RESISTORS			
R4068	X-R002T4473J	RC	47K OHM 1/4W
R4069	X-R801R7473J	RC	47K OHM 1/10W
R4071	X-R801R7182J	RC	1.8K OHM 1/10W
R4072	X-R903N8123J	RC	12K OHM 1/8W
R4074	X-R002T4102J	RC	1K OHM 1/4W
R4075	X-R903N8101J	RC	100 OHM 1/8W
R4076	X-R903N8101J	RC	100 OHM 1/8W
R4077	X-R801R7101J	RC	100 OHM 1/10W
R4078	X-R801R7101J	RC	100 OHM 1/10W
R4079	X-R002T4101J	RC	100 OHM 1/4W
R4080	X-R903N8101J	RC	100 OHM 1/8W
R4081	X-R002T4101J	RC	100 OHM 1/4W
R4085	X-R801R7393J	RC	39K OHM 1/10W
R4203	X-R801R7222J	RC	2.2K OHM 1/10W
R4204	X-R903N8102J	RC	1K OHM 1/8W
R4205	X-R801R7102J	RC	1K OHM 1/10W
R4212	X-R002T4102J	RC	1K OHM 1/4W
R4213	X-R903N8750J	RC	75 OHM 1/8W
R4217	X-R801R7102J	RC	1K OHM 1/10W
R4224	X-R903N8750J	RC	75 OHM 1/8W
R4231	X-R002T4222J	RC	2.2K OHM 1/4W
R4232	X-R903N8103J	RC	10K OHM 1/8W
R4238	X-R903N8330J	RC	33 OHM 1/8W
R4239	X-R002T2221J	RC	220 OHM 1/2W
R5501	X-R002T4153J	RC	15K OHM 1/4W
R5502	X-R903N8562J	RC	5.6K OHM 1/8W
R5503	X-R801R7106J	RC	10M OHM 1/10W
R5504	X-R801R7102J	RC	1K OHM 1/10W
R5505	X-R903N8682J	RC	6.8K OHM 1/8W
R5506	X-R903N8333J	RC	33K OHM 1/8W
R5507	X-R002T4333J	RC	33K OHM 1/4W
R5508	X-R903N8682J	RC	6.8K OHM 1/8W
R5510	X-R903N8333J	RC	33K OHM 1/8W
R5511	X-R903N8682J	RC	6.8K OHM 1/8W
R5512	X-R801R7275J	RC	2.7M OHM 1/10W
R5513	X-R903N8101J	RC	100 OHM 1/8W
R5514	X-R002T4333J	RC	33K OHM 1/4W
R5515	X-R903N8333J	RC	33K OHM 1/8W
R5516	X-R903N8682J	RC	6.8K OHM 1/8W
R5517	X-R903N8102J	RC	1K OHM 1/8W
R5519	X-R903N8152J	RC	1.5K OHM 1/8W
R5520	X-R801R7221J	RC	220 OHM 1/10W
R5521	X-R801R7221J	RC	220 OHM 1/10W
R5525	X-R002T4222J	RC	2.2K OHM 1/4W
R5526	X-R002T4222J	RC	2.2K OHM 1/4W
R6001	X-R801R7102J	RC	1K OHM 1/10W
CAPACITORS			
C301	X-E50HU5100M	CE	10 UF 50V
C302	X-CS0RB04L4K	CC	0.033 UF 50V B
C303	X-CS0RB04L4K	CC	0.033 UF 50V B
C304	X-CS0RB04H4K	CC	0.022 UF 50V B
C305	X-CS0RB04H4K	CC	0.022 UF 50V B
C306	X-CS0RB02Q5K	CC	0.47 UF 16V B
C307	X-CS0RB02Q5K	CC	0.47 UF 16V B
C308	X-CS0RB0413K	CC	0.001 UF 50V B
C309	X-E02LT2470M	CE	47 UF 16V
C310	X-CS0RB04H4K	CC	0.022 UF 50V B
C311	X-E50HU52R2M	CE	2.2 UF 50V
C312	X-E50HU52R2M	CE	2.2 UF 50V
C314	X-E50HU52R2M	CE	2.2 UF 50V
C315	X-E02LT2470M	CE	47 UF 16V
C316	X-CS0RB0315K	CC	0.1 UF 25V B
C317	X-P232W0104J	CMPL	0.1 UF 50V MMTS
C318	X-CS0RCH412J	CC	100 PF 50V CH
C319	X-CS0RCH412J	CC	100 PF 50V CH
C350	X-E50HU50R1M	CE	0.1 UF 50 V
C351	X-E50HU5010M	CE	1 UF 50V
C352	X-E50HU2470M	CE	47 UF 16V
C352	X-E50HU2330M	CE	33 UF 16 V
C353	X-E50HU2470M	CE	47 UF 16V
C354	X-E02LF3102M	CE	1000 UF 25V
C355	X-E00NU52R2M	CE	2.2 UF 50V
C401	X-E5EZT8100M	CE	10 UF 100V
C402	X-C0JTB0413K	CC	0.001 UF 50V B
C403	X-E02LT5100M	CE	10 UF 50V
C405	X-E02LT5100M	CE	10 UF 50V
C406	X-E5EZT4101M	CE	100 UF 35V

REF. NO.	PART NO.	DESCRIPTION	
CAPACITORS			
⚠ C407	X-E5EZF3102M	CE	1000 UF 25V
C408	X-E02LT5221M	CE	220 UF 50V
C411	X-P613T1104J	CMPL	0.1 UF 100V TF
C412	X-C0JTSL5H1K	CC	22 PF 500V SL
⚠ C413	X-P3N1F5333J	CPP	0.033 UF 630V
C415	X-P6M9T0334J	CMPL	0.33 UF 50V TF
C416	X-C0JTSL5H1J	CC	22 PF 500V SL
C417	X-C0JTB05S2K	CC	560 PF 500V B
C418	X-E5EZTD010M	CE	1 UF 250V
C419	X-P6M9T0473J	CMPL	0.047 UF 50V TF
C420	X-E02LT5470M	CE	47 UF 50V
C421	X-E5EZF4102M	CE	1000 UF 35V
C422	X-E5EZTD010M	CE	1 UF 250V
C423	X-P447F2474J	CMPP	0.47 UF 200V FHS
C424	X-E02LT1101M	CE	100 UF 10V
C425	X-E02LT5R47M	CE	0.47 UF 50V
C427	X-E53FF56R8K	CE	6.8 UF 50V NP
⚠ C428	X-P4N8FJ123H	CMPP	C 0.012 UF 1.25KV
C429	X-C13VB07Q2K	CC	470 PF 2KV B
C430	X-C01BBP713K	CC	0.001 UF 2KV BP
⚠ C431	X-E0ELTD100M	CE	10 UF 250V
C432	X-P613T1104J	CMPL	0.1 UF 100V TF
⚠ C433	X-E5EZT8220M	CE	22 UF 100V
C438	X-C0JTB05U2K	CC	680 PF 500V B
C439	X-C0JTB05H2K	CC	220 PF 500V B
⚠ C443	X-P4N8FJ222H	CMPP	C 0.0022UF 1.25KV
C450	X-C01BBP713K	CC	0.001 UF 2KV BP
⚠ C502	X-C13VB07H3K	CC	0.0022UF 2KV B
⚠ C503	X-C13VB07H3K	CC	0.0022UF 2KV B
⚠ C505	X-P2122B224M	CMP	0.22 UF 250V ECQUL
⚠ C506	X-P2122B104M	CMP	0.1 UF 250V ECQUL
⚠ C507	X-E51SFC821M	CE	820 UF 200V
C509	X-P6M9W0273J	CMPL	0.027 UF 50V TF
⚠ C510	X-E5EZT5470M	CE	47 UF 50V
C512	X-C0JTB0413K	CC	0.001 UF 50V B
C514	X-C010BP7K3K	CC	0.0027UF 2KV BP
C515	X-P1S3T0102J	CP	0.001 UF 50V
C516	X-C0JTB05Q2K	CC	470 PF 500V B
C517	X-C0JLYR7E3K	CC	0.0015UF 2KV YR
C518	X-C0JTB05Q2K	CC	470 PF 500V B
C519	X-C0JTB05Q2K	CC	470 PF 500V B
⚠ C520	X-E5EZT2102M	CE	1000 UF 16V
⚠ C521	X-E62D0C221M	CE	220 UF 200V
C522	X-C01BBP712K	CC	100 PF 2KV BP
⚠ C523	X-E5EZT4471M	CE	470 UF 35V
⚠ C524	X-E5EZF3102M	CE	1000 UF 25V
C527	X-C0JTB05Q2K	CC	470 PF 500V B
C528	X-C0JTF04H4Z	CC	0.022 UF 50V F
⚠ C529	X-C034E0J13M	CC	0.001 UF 125V MX
⚠ C530	X-C034E0JH3M	CC	0.0022UF 125V MX
⚠ C531	X-E5EZT3102M	CE	1000 UF 25V
⚠ C534	X-E02YFB101M	CE	100 UF 160V
⚠ C537	X-E02LT5R47M	CE	0.47 UF 50V
C549	X-P1S3T0333J	CP	0.033 UF 50V
C554	X-C0JTB04H3K	CC	0.0022UF 50V B
C601	X-E50HU5010M	CE	1 UF 50V
C602	X-CS0RF0415Z	CC	0.1 UF 50V F
C607	X-CS0RB0315K	CC	0.1 UF 25V B
C609	X-CS0RB0315K	CC	0.1 UF 25V B
C610	X-E50HU52R2M	CE	2.2 UF 50V
C612	X-E02LT0221M	CE	220 UF 6.3V
C613	X-CS0RB0315K	CC	0.1 UF 25V B
C614	X-CS0RB0414K	CC	0.01 UF 50V B
C615	X-CS0RCH413J	CC	0.001 UF 50V CH
C616	X-CS0RB0414K	CC	0.01 UF 50V B
C618	X-CS0RCH4L2J	CC	330 PF 50V CH
C620	X-E50HU0470M	CE	47 UF 6.3V
C621	X-CS0RB0414K	CC	0.01 UF 50V B
C622	X-CS0RB03H5K	CC	0.22 UF 25V B
C623	X-CS0RCH4U1J	CC	68 PF 50V CH
C624	X-E50HU2470M	CE	47 UF 16V
C625	X-CS0RF0216Z	CC	1 UF 16V F
C626	X-CS0RB0315K	CC	0.1 UF 25V B
C627	X-CS0RB0216K	CC	1 UF 16V B
C629	X-CS0RCH4H1J	CC	22 PF 50V CH
C630	X-CS0RB04H4K	CC	0.022 UF 50V B
C632	X-E50HU52R2M	CE	2.2 UF 50V

ELECTRICAL REPLACEMENT PARTS LIST

REF. NO.	PART NO.	DESCRIPTION		REF. NO.	PART NO.	DESCRIPTION	
		CAPACITORS				**CAPACITORS**	
C634	X-CS0RB0414K	CC	0.01 UF 50V B	C1020	X-E50HU2100M	CE	10 UF 16V
C635	X-E50HU2470M	CE	47 UF 16V	C1021	X-E50HU2330M	CE	33 UF 16 V
C636	X-CS0RB0414K	CC	0.01 UF 50V B	C1022	X-CS0RB0315K	CC	0.1 UF 25V B
C637	X-CS0RB0414K	CC	0.01 UF 50V B	C1023	X-CS0RCH4L2J	CC	330 PF 50V CH
C639	X-CS0RB0414K	CC	0.01 UF 50V B	C1025	X-CS0RB0315K	CC	0.1 UF 25V B
C640	X-CS0RB0315K	CC	0.1 UF 25V B	C1026	X-CS0RB0315K	CC	0.1 UF 25V B
C641	X-E02LT3221M	CE	220 UF 25V	C1027	X-CS0RB04N3K	CC	0.0039UF 50V B
C642	X-E50HU2220M	CE	22 UF 16 V	C1028	X-CS0RB0315K	CC	0.1 UF 25V B
C643	X-E50HU2220M	CE	22 UF 16 V	C1029	X-CS0RB0414K	CC	0.01 UF 50V B
C644	X-CS0RB04H4K	CC	0.022 UF 50V B	C1030	X-CS0RB0315K	CC	0.1 UF 25V B
C645	X-E50HU5010M	CE	1 UF 50V	C1031	X-CS0RB0413K	CC	0.001 UF 50V B
C647	X-CS0RB0414K	CC	0.01 UF 50V B	C1032	X-E50HU0221M	CE	220 UF 6.3V
C648	X-P1S3T0104J	CP	0.1 UF 50V	C1033	X-CS0RCH4U1J	CC	68 PF 50V CH
C649	X-E50HU5010M	CE	1 UF 50V	C1034	X-CS0RF0415Z	CC	0.1 UF 50V F
C650	X-CS0RB04E4K	CC	0.015 UF 50V B	C1035	X-CS0RCH422J	CC	200 PF 50V CH
C652	X-E5EZT5010M	CE	1 UF 50V	C1038	X-CS0RCH4W2J	CC	820 PF 50V CH
C653	X-CS0RB0414K	CC	0.01 UF 50V B	C1039	X-CS0RCH4U1J	CC	68 PF 50V CH
C654	X-CS0KCH4G1J	CC	18 PF 50V CH	C1040	X-CS0KCH4G1J	CC	18 PF 50V CH
C655	X-E50HU2470M	CE	47 UF 16V	C1041	X-CS0RB0315K	CC	0.1 UF 25V B
C656	X-CS0RB0216K	CC	1 UF 16V B	C1046	X-CS0KCH4G1J	CC	18 PF 50V CH
C658	X-CS0RB03H5K	CC	0.22 UF 25V B	C1047	X-CS0KCH4G1J	CC	18 PF 50V CH
C659	X-E50HU2470M	CE	47 UF 16V	C1048	X-CS0KCH4G1J	CC	18 PF 50V CH
C660	X-CS0RB0315K	CC	0.1 UF 25V B	C1049	X-CS0KCH4H1J	CC	22 PF 50V CH
C661	X-CS0RB0414K	CC	0.01 UF 50V B	C1050	X-CS0KCH421J	CC	20 PF 50V CH
C663	X-CS0RCH4N2J	CC	390 PF 50V CH	C1052	X-CS0RB0315K	CC	0.1 UF 25V B
C664	X-P232W0105J	CMPL	1 UF 50V MMTS	C1053	X-E02LT0221M	CE	220 UF 6.3V
C665	X-E02NT2100M	CE	10 UF 16V	C1054	X-CS0RF0415Z	CC	0.1 UF 50V F
C668	X-E50HU5220M	CE	22 UF 50 V	C1055	X-CS0RCH412J	CC	100 PF 50V CH
C669	X-CS0RB0315K	CC	0.1 UF 25V B	C1056	X-E50HU5010M	CE	1 UF 50V
C671	X-CS0RCH4H2J	CC	220 PF 50V CH	C1058	X-E02LT0102M	CE	1000 UF 6.3V
C674	X-CQGTB0415K	CC	0.1 UF 50V B	C1060	X-CS0RCH4E2J	CC	150 PF 50V CH
C675	X-CS0RB0315K	CC	0.1 UF 25V B	C1061	X-CS0RCH4E2J	CC	150 PF 50V CH
C676	X-CS0RCH4W1J	CC	82 PF 50V CH	C1062	X-CS0RB0216K	CC	1 UF 16V B
C680	X-E02LT0471M	CE	470 UF 6.3V	C1063	X-CS0RF0415Z	CC	0.1 UF 50V F
C687	X-CHGTB04E2K	CC	150 PF 50V B	C1065	X-CS0RF0415Z	CC	0.1 UF 50V F
C732	X-CS0RCH4K2J	CC	270 PF 50V CH	C1066	X-CS0RB0315K	CC	0.1 UF 25V B
C751	X-CHGTB0412K	CC	100 PF 50V B	C1068	X-CS0RB0315K	CC	0.1 UF 25V B
C755	X-E50HU0221M	CE	220 UF 6.3V	C1071	X-CS0RCH412J	CC	100 PF 50V CH
C779	X-CHGTB0413K	CC	0.001 UF 50V B	C1074	X-CS0RB0315K	CC	0.1 UF 25V B
C781	X-CHGTB0413K	CC	0.001 UF 50V B	C1076	X-CS0RB0315K	CC	0.1 UF 25V B
C804	X-CHGTB04S2K	CC	560 PF 50V B	C4002	X-CS0RB0414K	CC	0.01 UF 50V B
C805	X-CHGTB04N2K	CC	390 PF 50V B	C4003	X-CS0RB0315K	CC	0.1 UF 25V B
C806	X-CHGTB04U2K	CC	680 PF 50V B	C4004	X-E50HU2101M	CE	100 UF 16 V
C808	X-C01BBP713K	CC	0.001 UF 2KV BP	C4005	X-CS0RB0414K	CC	0.01 UF 50V B
C814	X-E02LTD010M	CE	1 UF 250V	C4006	X-CS0RB04E4K	CC	0.015 UF 50V B
C901	X-CS0RB0414K	CC	0.01 UF 50V B	C4007	X-E50HU5010M	CE	1 UF 50V
C902	X-CS0RB0414K	CC	0.01 UF 50V B	C4008	X-E50HU0101M	CE	100 UF 6.3V
C903	X-E50HU5R47M	CE	0.47 UF 50V	C4009	X-CS0RF0415Z	CC	0.1 UF 50V F
C905	X-CS0RB0414K	CC	0.01 UF 50V B	C4010	X-E50HU0470M	CE	47 UF 6.3V
C906	X-CS0RB0414K	CC	0.01 UF 50V B	C4011	X-E50HU5010M	CE	1 UF 50V
C907	X-E02LT0331M	CE	330 UF 6.3V	C4014	X-CS0RB04S4K	CC	0.056 UF 50V B
C908	X-CS0RCH412J	CC	100 PF 50V CH	C4015	X-P613T1223J	CMPL	0.022 UF 100V TF
C909	X-CS0RCH4G2J	CC	180 PF 50V CH	C4016	X-E50HU34R7M	CE	4.7 UF 25V
C910	X-CS0RB0414K	CC	0.01 UF 50V B	C4017	X-E50HU5010M	CE	1 UF 50V
C911	X-CS0RB0414K	CC	0.01 UF 50V B	C4018	X-CS0RB04B3K	CC	0.0012UF 50V B
C912	X-CS0RB0414K	CC	0.01 UF 50V B	C4020	X-CS0RB0414K	CC	0.01 UF 50V B
C913	X-CS0RB0414K	CC	0.01 UF 50V B	C4021	X-E50HU0330M	CE	33 UF 6.3V
C916	X-E50HU2470M	CE	47 UF 16V	C4022	X-E50HU2220M	CE	22 UF 16 V
C917	X-CS0RB0414K	CC	0.01 UF 50V B	C4023	X-E50HU0220M	CE	22 UF 6.3V
C919	X-CS0RCH4S1J	CC	56 PF 50V CH	C4024	X-E50HU34R7M	CE	4.7 UF 25V
C921	X-CS0RCH411D	CC	10 PF 50V CH	C4025	X-CS0RB04H3K	CC	0.0022UF 50V B
C923	X-CS0RCH4H2J	CC	220 PF 50V CH	C4026	X-E50HU0101M	CE	100 UF 6.3V
C925	X-CS0RB0315K	CC	0.1 UF 25V B	C4027	X-CS0RCH4W2J	CC	820 PF 50V CH
C926	X-CS0RCH4E1J	CC	15 PF 50V CH	C4028	X-CS0RB0315K	CC	0.1 UF 25V B
C1001	X-E02LT3101M	CE	100 UF 25V	C4029	X-CS0RF04Q4Z	CC	0.047 UF 50V F
C1002	X-CS0RB0413K	CC	0.001 UF 50V B	C4030	X-E50HU2100M	CE	10 UF 16V
C1003	X-E02LT0102M	CE	1000 UF 6.3V	C4031	X-E50HU52R2M	CE	2.2 UF 50V
C1005	X-CS0RB0413K	CC	0.001 UF 50V B	C4032	X-CS0RB04H4K	CC	0.022 UF 50V B
C1009	X-CS0RCH4L2J	CC	330 PF 50V CH	C4033	X-E50HU52R2M	CE	2.2 UF 50V
C1010	X-CS0RCH4L2J	CC	330 PF 50V CH	C4034	X-E50HU5010M	CE	1 UF 50V
C1013	X-CS0RB04N3K	CC	0.0039UF 50V B	C4035	X-E50HU0101M	CE	100 UF 6.3V
C1014	X-CS0RF0415Z	CC	0.1 UF 50V F	C4036	X-CS0RB04H4K	CC	0.022 UF 50V B
C1015	X-E50HU1470M	CE	47 UF 10 V	C4037	X-E50HU5010M	CE	1 UF 50V
C1016	X-E50HU2220M	CE	22 UF 16 V	C4038	X-CS0RF0415Z	CC	0.1 UF 50V F
C1017	X-CS0RB0315K	CC	0.1 UF 25V B	C4039	X-E50HU5010M	CE	1 UF 50V
C1018	X-E50HU54R7M	CE	4.7 UF 50V	C4041	X-CS0RCH4N2J	CC	390 PF 50V CH
C1019	X-CS0RCH413J	CC	0.001 UF 50V CH	C4043	X-E50HU5010M	CE	1 UF 50V

ELECTRICAL REPLACEMENT PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	
CAPACITORS			
C4044	X-CS0RF0415Z	CC	0.1 UF 50V F
C4047	X-CS0KCH4H1J	CC	22 PF 50V CH
C4048	X-CS0RB0414K	CC	0.01 UF 50V B
C4049	X-CS0RCH4G2J	CC	180 PF 50V CH
C4050	X-CS0RF0414Z	CC	0.01 UF 50V F
C4052	X-CS0RB0414K	CC	0.01 UF 50V B
C4053	X-CS0RB0414K	CC	0.01 UF 50V B
C4057	X-E50HU2330M	CE	33 UF 16 V
C4058	X-E50HU0220M	CE	22 UF 6.3V
C4059	X-E50HU34R7M	CE	4.7 UF 25V
C4060	X-E50HU5010M	CE	1 UF 50V
C4061	X-E50HU5010M	CE	1 UF 50V
C4062	X-E50HU5010M	CE	1 UF 50V
C4065	X-CS0RF0216Z	CC	1 UF 16V F
C4066	X-CS0RF0216Z	CC	1 UF 16V F
C4068	X-CS0RB04G3K	CC	0.0018UF 50V B
C4069	X-CS0RB0413K	CC	0.001 UF 50V B
C4070	X-E50HU0470M	CE	47 UF 6.3V
C4071	X-E50HU5010M	CE	1 UF 50V
C4072	X-CS0RB0315K	CC	0.1 UF 25V B
C4073	X-CS0RF0216Z	CC	1 UF 16V F
C4074	X-CS0RCH4Q2J	CC	470 PF 50V CH
C4075	X-E50HU2100M	CE	10 UF 16V
C4077	X-CS0RCH4K1J	CC	27 PF 50V CH
C4080	X-E5EZT5220M	CE	22 UF 50V
C4083	X-CS0RB0315K	CC	0.1 UF 25V B
C4084	X-CS0RB0315K	CC	0.1 UF 25V B
C4086	X-CS0RB0315K	CC	0.1 UF 25V B
C4088	X-CS0RB0315K	CC	0.1 UF 25V B
C4089	X-CHGTF0415Z	CC	0.1 UF 50V F
C4094	X-CQGTF0416Z	CC	1 UF 50V F
C4201	X-CHGTF0415Z	CC	0.1 UF 50V F
C4204	X-CS0RCH4Q2J	CC	470 PF 50V CH
C4205	X-CS0RF0415Z	CC	0.1 UF 50V F
C4206	X-E50HU2100M	CE	10 UF 16V
C4207	X-E50HU34R7M	CE	4.7 UF 25V
C4208	X-CS0RB0216K	CC	1 UF 16V B
C4209	X-CS0RCH4Q2J	CC	470 PF 50V CH
C4210	X-CS0RCH4Q2J	CC	470 PF 50V CH
C4211	X-E02LT2471M	CE	470 UF 16V
C4212	X-E50HU2100M	CE	10 UF 16V
C4213	X-CS0RCH4Q2J	CC	470 PF 50V CH
C4214	X-CS0RCH4Q2J	CC	470 PF 50V CH
C4216	X-CS0RB0216K	CC	1 UF 16V B
C4218	X-CS0RCH4Q1J	CC	47 PF 50V CH
C4220	X-E02LT2101M	CE	100 UF 16V
C4232	X-CS0RCH4Q2J	CC	470 PF 50V CH
C4245	X-E50HU54R7M	CE	4.7 UF 50V
C5501	X-E50HU0470M	CE	47 UF 6.3V
C5502	X-CS0RB0315K	CC	0.1 UF 25V B
C5506	X-CS0RB0315K	CC	0.1 UF 25V B
C5507	X-CS0RB0315K	CC	0.1 UF 25V B
C5508	X-CS0RB0315K	CC	0.1 UF 25V B
C5509	X-E50HU52R2M	CE	2.2 UF 50V
C5510	X-E50HU2470M	CE	47 UF 16V
C5512	X-E50HU2100M	CE	10 UF 16V
C5513	X-CS0RB0315K	CC	0.1 UF 25V B
C5514	X-CS0RB02L5K	CC	0.33 UF 16V B
C5515	X-CS0RB04H4K	CC	0.022 UF 50V B
C5516	X-E50HU2100M	CE	10 UF 16V
C5518	X-E50HU53R3M	CE	3.3 UF 50V
C5519	X-CS0RF0216Z	CC	1 UF 16V F
C5522	X-CS0RCH4I1J	CC	24 PF 50V CH
C5523	X-E50HU54R7M	CE	4.7 UF 50V
C5524	X-CS0RB0315K	CC	0.1 UF 25V B
C5525	X-E50HU2100M	CE	10 UF 16V
C5526	X-E50HU34R7M	CE	4.7 UF 25V
C5527	X-E211T2100K	CTANTAL	10 UF 16V
C5528	X-E50HU5010M	CE	1 UF 50V
C5529	X-E50HU5010M	CE	1 UF 50V
C5530	X-CS0RB0315K	CC	0.1 UF 25V B
C5531	X-E50HU0470M	CE	47 UF 6.3V
C5532	X-E50HU34R7M	CE	4.7 UF 25V
C5533	X-E50HU5010M	CE	1 UF 50V
C5534	X-E50HU2330M	CE	33 UF 16 V
C5535	X-E50HU5010M	CE	1 UF 50V
C5536	X-E50HU2100M	CE	10 UF 16V
C5537	X-E50HU5010M	CE	1 UF 50V
C5538	X-E50HU2100M	CE	10 UF 16V
C5539	X-E50HU0330M	CE	33 UF 6.3V
C5540	X-CS0RB04E4K	CC	0.015 UF 50V B
C5541	X-CS0RB03H5K	CC	0.22 UF 25V B
C5542	X-CS0RB0315K	CC	0.1 UF 25V B
C5543	X-CS0RB0414K	CC	0.01 UF 50V B
C5544	X-CS0RB0414K	CC	0.01 UF 50V B
C5545	X-CS0RB0315K	CC	0.1 UF 25V B
C5546	X-CS0RB04E4K	CC	0.015 UF 50V B
C5547	X-E50HU2100M	CE	10 UF 16V
C5548	X-E50HU2100M	CE	10 UF 16V
C5549	X-CS0RB0315K	CC	0.1 UF 25V B
C5550	X-E50HU0470M	CE	47 UF 6.3V
C5551	X-CS0RB0414K	CC	0.01 UF 50V B
C5552	X-E50HU2100M	CE	10 UF 16V
C5553	X-CS0RCH4Q2J	CC	470 PF 50V CH
C5554	X-CS0RCH4Q2J	CC	470 PF 50V CH
C5556	X-CS0RB04H3K	CC	0.0022UF 50V B
C5557	X-CS0RB04E3K	CC	0.0015UF 50V B
C5558	X-CS0RB04E3K	CC	0.0015UF 50V B
C5559	X-CS0RB04W2K	CC	820 PF 50V B
C5560	X-CS0RCH412J	CC	100 PF 50V CH
C5561	X-CS0RCH412J	CC	100 PF 50V CH
DIODES			
D301	X-D97U01301B	DIODE,ZENER	MTZJ13B T-77
D302	X-D97U01301B	DIODE,ZENER	MTZJ13B T-77
D401	X-D2WT011E10	DIODE,SILICON	11E1-EIC
D403	X-D97U03001B	DIODE,ZENER	MTZJ30B T-77
D404	X-D97U03001B	DIODE,ZENER	MTZJ30B T-77
D406	X-D2LTPG06J0	DIODE,SILICON	RMPG06J-G3
⚠ D407	X-DCBFMV3FU0	DIODE	FMV-3FULF027-102
⚠ D408	X-D94TA27011	DIODE,ZENER	HZ27-1L TD
⚠ D409	X-D94TA11B13	DIODE,ZENER	HZ11B3L TD
D410	X-D97U06R81B	DIODE,ZENER	MTZJ6.8B T-77
⚠ D411	X-D2LTPG06J0	DIODE,SILICON	RMPG06J-G3
⚠ D412	X-D2LTPG06J0	DIODE,SILICON	RMPG06J-G3
⚠ D413	X-D2LTPG06J0	DIODE,SILICON	RMPG06J-G3
D414	X-D2LTPG06J0	DIODE,SILICON	RMPG06J-G3
⚠ D415	X-D2LTPG06J0	DIODE,SILICON	RMPG06J-G3
⚠ D501	X-D4LZBL06L0	DIODE	GBL06L-6177
⚠ D503	X-D2BTRU2AM0	DIODE,SILICON	RU2AM V1
⚠ D505	X-D28F21DQN9	DIODE,SCHOTTKY	21DQ09N-FC4
D506	X-D2LTPG06J0	DIODE,SILICON	RMPG06J-G3
D507	X-D23U1003A3	DIODE,SCHOTTKY	SB10-03A3
⚠ D508	X-D28T21DQN9	DIODE,SCHOTTKY	21DQ09N-TA2B1
⚠ D510	X-D2BTRU2AM0	DIODE,SILICON	RU2AM V1
⚠ D511	X-D28TELS2N2	DIODE,RECTIFER	10ELS2N-TA1B2
⚠ D512	X-D28T21DQN9	DIODE,SCHOTTKY	21DQ09N-TA2B1
⚠ D514	X-D28T21DQN9	DIODE,SCHOTTKY	21DQ09N-TA2B1
⚠ D515	X-D97U03301B	DIODE,ZENER	MTZJ33B T-77
D516	X-D1VT001330	DIODE,SILICON	1SS133T-77
D517	X-D1VT001330	DIODE,SILICON	1SS133T-77
D518	X-D1VT001330	DIODE,SILICON	1SS133T-77
⚠ D519	X-D28T21DQN9	DIODE,SCHOTTKY	21DQ09N-TA2B1
D521	X-D1VT001330	DIODE,SILICON	1SS133T-77
D523	X-D1VT001330	DIODE,SILICON	1SS133T-77
D524	X-D1VT001330	DIODE,SILICON	1SS133T-77
D525	X-D1VT001330	DIODE,SILICON	1SS133T-77
D526	X-D1VT001330	DIODE,SILICON	1SS133T-77
D528	X-D97U05R61B	DIODE,ZENER	MTZJ5.6B T-77
D529	X-D1VT001330	DIODE,SILICON	1SS133T-77
D530	X-D1VT001330	DIODE,SILICON	1SS133T-77
⚠ D533	X-D28TELS2N2	DIODE,RECTIFER	10ELS2N-TA1B2
⚠ D534	X-D28F21DQN9	DIODE,SCHOTTKY	21DQ09N-FC4
D601	X-D1VT001330	DIODE,SILICON	1SS133T-77
D602	X-D97U08R21C	DIODE,ZENER	MTZJ8.2C T-77
D605	X-D28T11ESN1	DIODE,SILICON	11ES1N-TA1B2
D607	X-D1VT001330	DIODE,SILICON	1SS133T-77
D608	X-D97U06R81B	DIODE,ZENER	MTZJ6.8B T-77
D609	X-D97U06R81B	DIODE,ZENER	MTZJ6.8B T-77
D610	X-D23U1003A3	DIODE,SCHOTTKY	SB10-03A3
D611	X-D28TQS04N0	DIODE,SCHOTTKY	11EQS04N-TA1B2
D612	X-D97U06R81B	DIODE,ZENER	MTZJ6.8B T-77
D613	X-D97U06R81B	DIODE,ZENER	MTZJ6.8B T-77
D614	X-D97U06R81B	DIODE,ZENER	MTZJ6.8B T-77
D615	X-D97U06R81B	DIODE,ZENER	MTZJ6.8B T-77

ELECTRICAL REPLACEMENT PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	
		DIODES	
D616	X-D1VT001330	DIODE,SILICON	1SS133T-77
D617	X-D1VT001330	DIODE,SILICON	1SS133T-77
D618	X-D1VT001330	DIODE,SILICON	1SS133T-77
D791	X-002175P230	LED	SLR-342MCT32
D793	X-0021721150	LED	SLR-342VCT32
D794	X-0021721150	LED	SLR-342VCT32
D801	X-D1VT001330	DIODE,SILICON	1SS133T-77
D802	X-D1VT001330	DIODE,SILICON	1SS133T-77
D803	X-D1VT001330	DIODE,SILICON	1SS133T-77
D1001	X-D2WT011E10	DIODE,SILICON	11E1-EIC
D1002	X-D1VT001330	DIODE,SILICON	1SS133T-77
D1003	X-0010600060	LED	SID1050CM
D1004	X-D92T1120B0	DIODE,ZENER	RD12FB-T7
D1005	X-D2WT011E10	DIODE,SILICON	11E1-EIC
D1009	X-D1VT001330	DIODE,SILICON	1SS133T-77
D1010	X-D97U01301B	DIODE,ZENER	MTZJ13B T-77
D1011	X-D97U01301B	DIODE,ZENER	MTZJ13B T-77
D1012	X-D1VT001330	DIODE,SILICON	1SS133T-77
D1014	X-D97U05R11B	DIODE,ZENER	MTZJ5.1B T-77
D4003	X-D97U01301B	DIODE,ZENER	MTZJ13B T-77
D4004	X-D97U01301B	DIODE,ZENER	MTZJ13B T-77
D4201	X-D97U05R61B	DIODE,ZENER	MTZJ5.6B T-77
D4203	X-D97U06R81B	DIODE,ZENER	MTZJ6.8B T-77
D4204	X-D1VT001330	DIODE,SILICON	1SS133T-77
D4206	X-D97U01301B	DIODE,ZENER	MTZJ13B T-77
D5501	X-D1VT001330	DIODE,SILICON	1SS133T-77
		ICS	
IC301	X-I06DF62420	IC	M62420SP
IC352	X-I0FSP75220	IC	AN7522
⚠ IC401	X-I03TD80400	IC	LA78040
⚠ IC501	X-I1KA97805A	IC	KIA7805API
⚠ IC502	X-I2BT06624G	IC	STR-G6624
⚠ IC506	X-0002500450	PHOTO COUPLER	TLP621(GR)
IC601	X-I06FC1203C	IC	M61203CFP
⚠ IC603	X-I1KA97809A	IC	KIA7809API or
	X-I1KA978090	IC	KIA7809PI
IC901	X-I05FE90A45	IC	TC90A45F
IC1001	X-I56F57043C	IC	OEC7043C
IC1002	X-I9UJ0T600H	IC	PST600H
IC1003	X-I07SQ69550	IC	BA6955N
IC1099	X-A57202B015	IC	S-24C04BDP-LA
IC4001	X-I03F31067S	IC	LA71067SM-MPB
IC5501	X-I01F62FBP0	IC	AN3662FBP
		TRANSISTORS	
Q350	X-T8YJ2412K0	TRANSISTOR,SILICON	2SC2412KT146 R,S
Q401	X-TA3T016240	TRANSISTOR,SILICON	2SA1624-AA
Q402	X-TNYTJ03001	COMPOUND TRANSISTOR	DTC114TSTP
Q403	X-TNYTJ03001	COMPOUND TRANSISTOR	DTC114TSTP
Q404	X-TA5T010154	TRANSISTOR,SILICON	2SA1015Y(TPE2)
⚠ Q405	X-TC3Q026210	TRANSISTOR,SILICON	2SC2621(D,E)-RAC
⚠ Q406	X-TDUU024990	TRANSISTOR,SILICON	2SD2499(LB0EC1)
Q407	X-TC5T018154	TRANSISTOR,SILICON	2SC1815Y(TPE2)
Q408	X-TA5T010154	TRANSISTOR,SILICON	2SA1015Y(TPE2)
Q409	X-TD30016670	TRANSISTOR,SILICON	2SD1667(R,S)
Q410	X-TNYTJ03001	COMPOUND TRANSISTOR	DTC114TSTP
Q501	X-TDWT00400E	TRANSISTOR,SILICON	2SD400E
Q502	X-TA3T1371A0	TRANSISTOR,SILICON	2SA1371(D,E)-AE
Q503	X-TA3T1371A0	TRANSISTOR,SILICON	2SA1371(D,E)-AE
Q504	X-TC5T018154	TRANSISTOR,SILICON	2SC1815Y(TPE2)
Q505	X-TC3T029090	TRANSISTOR,SILICON	2SC2909(S,T)-AA
Q507	X-TCST009450	TRANSISTOR,SILICON	2SC945(C)-T(P,Q)
⚠ Q508	X-TB3T008920	TRANSISTOR,SILICON	2SB892(S,T)-AE
Q509	X-TNYTJ03001	COMPOUND TRANSISTOR	DTC114TSTP
Q512	X-TC3T029090	TRANSISTOR,SILICON	2SC2909(S,T)-AA
Q513	X-TNYTB03001	COMPOUND TRANSISTOR	DTC114ESTP
Q601	X-T6YJ1037K0	TRANSISTOR,SILICON	2SA1037AKT146R,S
⚠ Q602	X-TC10013840	TRANSISTOR,SILICON	2SC13840W
⚠ Q603	X-TC10013840	TRANSISTOR,SILICON	2SC13840W
Q604	X-T8YJ2412K0	TRANSISTOR,SILICON	2SC2412KT146 R,S
Q605	X-TB3T008920	TRANSISTOR,SILICON	2SB892(S,T)-AE
⚠ Q606	X-TC5T021204	TRANSISTOR,SILICON	2SC2120Y(TPE2)
Q607	X-T8YJ2412K0	TRANSISTOR,SILICON	2SC2412KT146 R,S
Q609	X-TNYJD05001	COMPOUND TRANSISTOR	DTC144EKAT146
⚠ Q610	X-TD3T007340	TRANSISTOR,SILICON	2SD734(E,F)-AA
⚠ Q611	X-TD3T007340	TRANSISTOR,SILICON	2SD734(E,F)-AA
Q612	X-TC3T030000	TRANSISTOR,SILICON	2SC3000-AA
⚠ Q801	X-TC3Q026210	TRANSISTOR,SILICON	2SC2621(D,E)-RAC

REF. NO.	PART NO.	DESCRIPTION	
		TRANSISTORS	
⚠ Q802	X-TC3Q026210	TRANSISTOR,SILICON	2SC2621(D,E)-RAC
⚠ Q803	X-TC3Q026210	TRANSISTOR,SILICON	2SC2621(D,E)-RAC
⚠ Q810	X-TC7T1740S0	TRANSISTOR,SILICON	2SC1740SP(R,S) TP
⚠ Q811	X-TC7T1740S0	TRANSISTOR,SILICON	2SC1740SP(R,S) TP
⚠ Q812	X-TC7T1740S0	TRANSISTOR,SILICON	2SC1740SP(R,S) TP
Q901	X-T8YJ2412K0	TRANSISTOR,SILICON	2SC2412KT146 R,S
Q902	X-T8YJ2412K0	TRANSISTOR,SILICON	2SC2412KT146 R,S
Q903	X-T8YJ2412K0	TRANSISTOR,SILICON	2SC2412KT146 R,S
Q1001	X-0002700590	PHOTO COUPLER	RPI-301
Q1002	X-T8YJ2412K0	TRANSISTOR,SILICON	2SC2412KT146 R,S
Q1003	X-0002M00610	PHOTO COUPLER	SG-276
Q1004	X-TNYJC05001	COMPOUND TRANSISTOR	DTC124EKAT146
Q1005	X-0002700590	PHOTO COUPLER	RPI-301
Q1009	X-0002M00610	PHOTO COUPLER	SG-276
Q1013	X-0000100380	PHOTO TRANSISTOR	PNA2604M010R
Q4001	X-TC3T033310	TRANSISTOR,SILICON	2SC3331(S,T,U)-A
Q4002	X-TC3T033310	TRANSISTOR,SILICON	2SC3331(S,T,U)-A
Q4003	X-TPYTC03001	COMPOUND TRANSISTOR	DTA124ESTP
Q4004	X-T8YJ2412K0	TRANSISTOR,SILICON	2SC2412KT146 R,S
Q4005	X-TA3T013180	TRANSISTOR,SILICON	2SA1318(S,T)-AA
Q4006	X-TD3T007340	TRANSISTOR,SILICON	2SD734(E,F)-AA
Q4007	X-T6YJ1037K0	TRANSISTOR,SILICON	2SA1037AKT146R,S
Q4008	X-T8YJ2412K0	TRANSISTOR,SILICON	2SC2412KT146 R,S
Q4009	X-T6YA1037K0	TRANSISTOR,SILICON	2SA1037KT147(R,S)
Q4010	X-T8YJ2412K0	TRANSISTOR,SILICON	2SC2412KT146 R,S
Q4201	X-TNYJB05001	COMPOUND TRANSISTOR	DTC114EKAT146
Q4203	X-T8YJ2412K0	TRANSISTOR,SILICON	2SC2412KT146 R,S
Q4205	X-TNYJB05001	COMPOUND TRANSISTOR	DTC114EKAT146
Q4206	X-TNYJB05001	COMPOUND TRANSISTOR	DTC114EKAT146
Q4210	X-T6YJ1037K0	TRANSISTOR,SILICON	2SA1037AKT146R,S
Q4211	X-T8YJ2412K0	TRANSISTOR,SILICON	2SC2412KT146 R,S
Q4212	X-T6YJ1037K0	TRANSISTOR,SILICON	2SA1037AKT146R,S
		COILS &TRANSFORMERS	
L001	X-02A1281872	CORE,TRIDAL	KR16TT281807D
L301	X-02167D101K	COIL	100 UH
L302	X-02167D101K	COIL	100 UH
L401	X-021679472K	COIL	4.7 MH
⚠ L402	X-022100027A	COIL,LINEARITY	ELH5L4113N
L481	X-02D8000012	TIB PIN PHASE COIL	D8000012
⚠ L501	X-029X000088	COIL,LINE FILTER	SS24V-15045
⚠ L503	X-028R200024	COIL,DEGAUSS	8R200024
L602	X-021LA62R7K	COIL	2.7 UH
L603	X-021673101K	COIL	100 UH
L605	X-021LA62R7K	COIL	2.7 UH
L607	X-021LA6100K	COIL	10 UH
L608	X-021673101K	COIL	100 UH
L610	X-02167D101K	COIL	100 UH
L613	X-021LA62R2K	COIL	2.2 UH
L614	X-021LA66R8K	COIL	6.8 UH
L615	X-02167D101K	COIL	100 UH
L616	X-02167D101K	COIL	100 UH
L617	X-02A6A8A0A1	CORE,FERRITE	HF57T18.5*10*10
L618	X-021LA6330K	COIL	33 UH
L620	X-021LA6470J	COIL	47 UH
L801	X-02167D151K	COIL	150 UH
L802	X-02167D820K	COIL	82 UH
L804	X-02167D820K	COIL	82 UH
L901	X-02167D821K	COIL	820 UH
L902	X-021673151K	COIL	150 UH
L903	X-02167F150J	COIL	15 UH
L904	X-021LA6820K	COIL	82 UH
L1001	X-021LA62R2K	COIL	2.2 UH
L4001	X-02167F220J	COIL	22 UH
L4002	X-02167F470J	COIL	47 UH
L4003	X-021673101J	COIL	100 UH
L4004	X-0326230038	COIL,TRAP	2623003
L4005	X-02167F220J	COIL	22 UH
L4007	X-021LA6101K	COIL	100 UH
L4009	X-02167F101J	COIL	100 UH
L4010	X-02167F101J	COIL	100 UH
L4205	X-021673101K	COIL	100 UH
L5501	X-021673101K	COIL	100 UH
L5503	X-021LA6820K	COIL	82 UH
L5504	X-02167F220J	COIL	22 UH
L5505	X-02167F220J	COIL	22 UH
L5506	X-02167F101J	COIL	100 UH

ELECTRICAL REPLACEMENT PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	
COILS &TRANSFORMERS			
T401	X-0450130001J	TRANS,HORIZONTAL DRIVE	5013001
⚠ T501	X-0481350524	TRANSFORMER,SWITCHING	81350524
T4001	X-031626007S	COIL,BIAS OSC	1626007
JACKS			
⚠ J351	X-060G131014	RCA JACK	HTJ-035-28A
J701	X-0602431013	RCA JACK	JPJ1187-010010
⚠ J801	X-066C130017	SOCKET,CRT	CVT3275-5101
J4201	X-060Q431016	RCA JACK	AV3-19S-1
J4202	X-060Q411012	RCA JACK	AV3-19-1
SWITCHES			
SW751	X-0504201T32	SWITCH,TACT	SKQNAED010
SW791	X-0504201T32	SWITCH,TACT	SKQNAED010
SW792	X-0504201T32	SWITCH,TACT	SKQNAED010
SW793	X-0504201T32	SWITCH,TACT	SKQNAED010
SW794	X-0504201T32	SWITCH,TACT	SKQNAED010
SW795	X-0504201T32	SWITCH,TACT	SKQNAED010
SW796	X-0504201T32	SWITCH,TACT	SKQNAED010
SW797	X-0504201T32	SWITCH,TACT	SKQNAED010
SW798	X-0504201T32	SWITCH,TACT	SKQNAED010
SW799	X-0504201T32	SWITCH,TACT	SKQNAED010
SW1001	X-0508221001	SWITCH (LEAF)	SPVF130100
VARIABLE RESISTORS			
VR401	X-V1163H4BTC	VOLUME,SEMI FIXED	EVNCYAA03BE4
VR402	X-V1163H4BTC	VOLUME,SEMI FIXED	EVNCYAA03BE4
VR404	X-V1163E3BTC	VOLUME,SEMI FIXED	EVNCYAA03BC3
VR502	X-V1163Q2BTC	VOLUME,SEMI FIXED	EVNCYAA03BQ2
VR6001	X-V1262Q3BT6	VOLUME,SEMI FIXED	RH063LCS3R
MISCELLANEOUS			
B301	X-024AT03655	CORE,BEADS	BL01RN1-A63T6
B502	X-024AT03482	CORE,BEADS	BL02RN2-R62T4
B504	X-024AT03655	CORE,BEADS	BL01RN1-A63T6
B505	X-024AT03482	CORE,BEADS	BL02RN2-R62T4
B1001	X-024AT03481	CORE,BEADS	BL02RN1-R62T2
B4002	X-024AT03481	CORE,BEADS	BL02RN1-R62T2
B4003	X-024AT03655	CORE,BEADS	BL01RN1-A63T6
B4004	X-024AT03655	CORE,BEADS	BL01RN1-A63T6
B4005	X-024AT03655	CORE,BEADS	BL01RN1-A63T6
BT001	X-141L003010	BATTERY,MANGAN	R6P(AR)XICI
BT002	X-141L003010	BATTERY,MANGAN	R6P(AR)XICI
CD302	X-06CH01812A	CORD,EIS CONNECTOR	CH01812A
CD355	X-06CH12435A	CORD,CONNECTOR	CH12435A
CD356	X-06CH12440A	CORD,CONNECTOR	CH12440A
⚠ CD501	X-120R614909	CORD,AC	0R614909
CD601	X-06CH2D068A	CORD,CONNECTOR	CH2D068A
CD702	X-06CH2B032A	CORD,CONNECTOR	CH2B032A
CD704	X-06CH2D001A	CORD,CONNECTOR	CH2D001A
CD757	X-06CH2A012A	CORD,CONNECTOR	CH2A012A
CD802	X-06CP83035A	CORD,CONNECTOR	CP83035A
CD803	X-122E054402	CORD,JUMPER	2E054402
CD810	X-06CH28112A	CORD,CONNECTOR	CH28112A
CD850	X-06CH25086A	CORD,CONNECTOR	CH25086A
CF601	X-1022T45R72	FILTER,SAW	SAF45MFY220ZR
CF602	X-1012T04702	FILTER,CERAMIC TRAP	MKT47.3MC110P-TF
CF603	X-1011T4R504	FILTER,CERAMIC	EFCT4R5YS5A
CF604	X-1011T4R517	FILTER,CERAMIC	EFCT4R5MW5
⚠ CP401	X-069X450029	CONNECTOR PCB SIDE	B05B-DVS
⚠ CP501	X-0697320039	CORD,UX CONNECTOR	THL-P03P-B1
⚠ CP502	X-069W420029	CONNECTOR PCB SIDE	TV-50P-02-A1
CP602	X-069E270129	CONNECTOR PCB SIDE	8283_0712_00_000
CP604	X-069J160038	CONNECTOR PCB SIDE	IMSA-9130B-06
CP704	X-069E2D0129	CONNECTOR PCB SIDE	8283_1312_00_000
CP801	X-069W010010	CONNECTOR PCB SIDE	005P-2100
CP802	X-069W330018	CONNECTOR PCB SIDE	TS-80P-03-V1
CP805	X-069E250129	CONNECTOR PCB SIDE	8283_0512_00_000
CP810	X-069E280129	CONNECTOR PCB SIDE	8283_0812_00_000
CP820	X-069E2D0129	CONNECTOR PCB SIDE	8283_1312_00_000
CY901	X-069J160048	CONNECTOR PCB SIDE	IMSA-9130S-06L
CD1001	X-122L040904	CORD,JUMPER	2L040904
CD1002	X-122F051702	CORD,JUMPER	2F051702

REF. NO.	PART NO.	DESCRIPTION	
MISCELLANEOUS			
CD4001	X-122L061501	CORD,JUMPER	2L061501
CD4203	X-06CH01812A	CORD,EIS CONNECTOR	CH01812A
CP1004	X-0697280590	CONNECTOR PCB SIDE	TMC-J08P-B1
CP1005	X-069J750029	CONNECTOR PCB SIDE	IMSA-9604S-05Z14
CP1006	X-069J740029	CONNECTOR PCB SIDE	IMSA-9604S-04Z14
CP4001	X-0697290620	CONNECTOR PCB SIDE	TOC-C09X-A1
CP4002	X-069J760029	CONNECTOR PCB SIDE	IMSA-9604S-06Z14
CP4003	X-0697120320	CONNECTOR PCB SIDE	TMC-T02X-E1
CP4201	X-069E2A0129	CONNECTOR PCB SIDE	8283_1012_00_000
CP4202	X-069E2B0129	CONNECTOR PCB SIDE	8283_1112_00_000
CP803A	X-067R105019	WIRE HOLDER	51052-0500
CP803B	X-067R105019	WIRE HOLDER	51052-0500
CUS011	X-800WFAA006	CUSHION-A	
CUS012	X-800WFAA007	CUSHION-B	
CUS013	X-800WFAA008	CUSHION-C	
EL001	X-124116281A	EYE LET	XRY16X28BD
EL002	X-124120301A	EYE LET	XRY20X30BD
⚠ F501	X-081PC6R304	FUSE	51MS063LCC
⚠ F502	X-081PC2R504	FUSE	51MS025LCC
⚠ FB401	X-043221011Q	TRANSFORMER,FLYBACK	3221011Q
FH501	X-06710T0006	HOLDER,FUSE	EYF-52BC
FH502	X-06710T0006	HOLDER,FUSE	EYF-52BC
FH503	X-06710T0006	HOLDER,FUSE	EYF-52BC
FH504	X-06710T0006	HOLDER,FUSE	EYF-52BC
OS753	X-077Q000019	REMOTE RECEIVER	PIC-28143TC5
⚠ RY501	X-0560Q20114	RELAY	SDT-S-112LMR
⚠ SP351	X-070W133014	SPEAKER	P-300S-2
⚠ SP352	X-070W133014	SPEAKER	P-300S-2
⚠ TH501	X-DF20A3R0Q0	DEGAUSS ELEMENT	PTH451A3R0Q11
TM101	X-076G0DY010	TRANSMITTER	RM-C393G-1H
⚠ TU601	X-0145W00052	TUNER,VHF-UHF	NJH3022U268
X602	X-100CT3R505	CRYSTAL HC-49/C	3.579545MHz
X1001	X-100CT01207	CRYSTAL HC-49/U-S	12MHz
X1002	X-100DA32R01	CRYSTAL DT-26	32.768
X4001	X-100CF3R512	CRYSTAL HC-49/U	3.579545MHZ

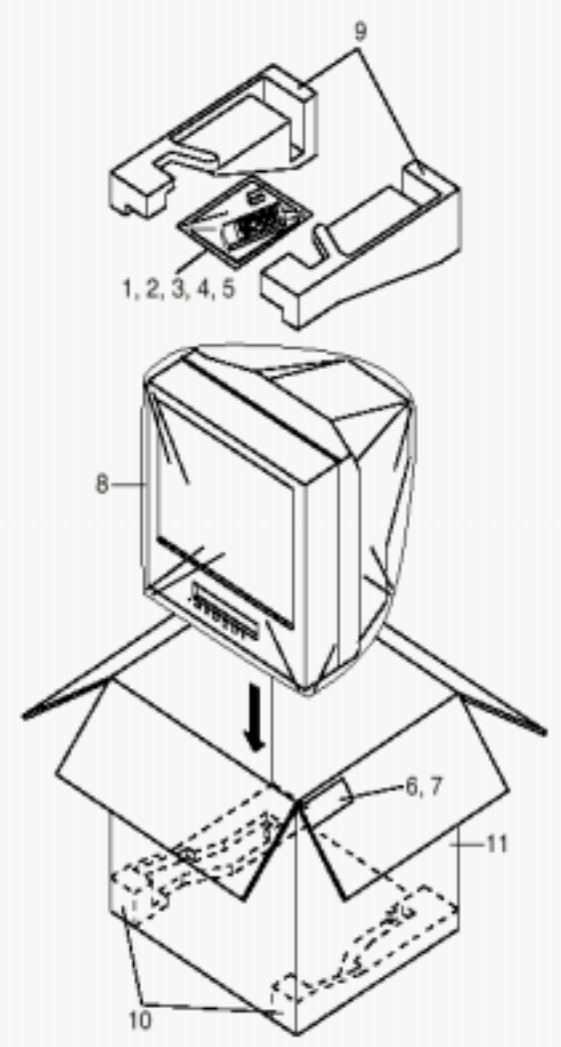
RESISTOR

RC..... CARBON RESISTOR

CAPACITORS

CC..... CERAMIC CAPACITOR
CE..... ALUMI ELECTROLYTIC CAPACITOR
CP..... POLYESTER CAPACITOR
CPP..... POLYPROPYLENE CAPACITOR
CPL..... PLASTIC CAPACITOR
CMP..... METAL POLYESTER CAPACITOR
CMPL..... METAL PLASTIC CAPACITOR
CMPP..... METAL POLYPROPYLENE CAPACITOR

ELECTRICAL REPLACEMENT PARTS LIST



ACCESSORY REPLACEMENT PARTS LIST

REF. NO.	PART NO.	DESCRIPTION
1	X-076G0DY010	REMOCON RM-C393G-1H
2	X-JB5KD500	POLYBAG
3	X-J5500115	SERVICE STATION LIST
4	X-J5500117	REGISTRATION CARD
5	X-J5720201	INSTRUCTION BOOK
6	X-J5500112	GUARANTEE CARD
7	X-J5501202	GUARANTEE CARD
8	X-791WHA0085	LAMIFILM,BAG
9	X-792WHA0288	PACKAGE,TOP
10	X-792WHA0289	PACKAGE,BOTTOM
11	X-793WCD1294	GIFT BOX

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